RAILROAD GAZETTE

FRIDAY, MAY 14.

Contributions.

Reminiscences—Refrigerator Cars.

BRISTOL, Tenn., May 1, 1886.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Most improvements originate from small beginnings. The first attempt to transport perishable articles affected by warm weather was made on the Concord & Nashua Railroad, about 1848, by a man (the name is now forgotten) who undertook to ship dressed veal and lambs to Nashua, Lowell and Boston in cool cars. For that purpose he fitted up what was then called a car; it was a four-wheeled car about 16 ft. long (a 30 ft. car was then rated as two cars in estimating the number of cars in a train). It was lined up with matched boards at the side, and an inside door, with a trough at one end, at the bottom, to hold the ice, and was arranged with hooks at the sides and top for hanging up the dressed sides. It proved to be better than the ordinary car, yet it did not prove a success; proper ventilation was not given, and the ice was placed in a wrong position to get the desired effect, and after two seasons it was abandoned.

In 1851 the writer was connected with the Ogdensburg & Lake Champlain Railroad and its Boston connection in the through freight department. This road had been open about one year. The road ran through a fine grazing country, and stock-raising was the principal money production, and the western part was settled largely by the Scotch and Scotch-Irish, who understood butter making, and produced as fine a quality as the "gilt-edge" of to-day. Knowing this fact, it occurred to me that if that butter could be placed in the Boston market weekly in as good condition as it came from the cellars of the farmer, it would not only enable those farmers to get better prices and ready money, and give a good article to Boston consumers at a reduced price, but at the same time it would increase the traffic of the line, as the usual method was to hold this butter until cool weather and ship it the best they could to New York; but by long keeping at home and slow transportation the butter, once a fine article, was reduced to a common grade and sold there for indifferent prices.

I suggested to Colonel Slaughter, then Superintendent of the road, the plan of building or fitting up some refrigerator cars for the transportation of this butter, and to fit them up on as scientific principles as the house refrigerator. It did not take an hour for him to catch at the idea, and he commissioned me to get up the number I thought it would require, and directed Mr. Klohs, his Master Mechanic, to fit them up as I might direct. Mr. Klohs being a fine mechanic and also of a scientific mind, it took but little time to explain what was needed, and in fact it was due to him that we got up four cars (30 ft.) in the best possible manner, and in every respect as well constructed as if they were refrigerators for family use, filling them between lining and outside with fine charcoal.

We got out our advertisement and the rates charged (which were double the freight in ordinary cars), and posted all the station agents on the line, and got them to work up the matter, and give notice of the days the car would run; and also posted some of the Boston butter men, who sent out circulars soliciting consignments.

All prepared, we commenced the second Monday in June, 1851, starting from Ogdensburg in the morning with one car for a trial, connected to the through freight train, and before we reached Rouse's Point our car was filled to its full capacity. The car reached Boston the next day, and the consignees were on hand to receive their consignments, and others interested were present to see the result. The car had been twice replenished with ice, and on trial the butter was found in *perfect* order, and the cargo sold at once at high prices. This decided the success of the refrigerator cars. We at once built or fitted up four more, and it was none too many to get them returned in season to have enough at Ogdensburg every Monday morning to supply the demand. This continued through the season, and even Watertown made shipments by the refrigerator line. It was a success.

In 1852, the writer opened the Rutland & Washington Railroad, and in 1853 had refrigerator cars fitted up, which ran through from Rutland, Vt., to New York, or the reverse, *via* Rutland to Boston, and in the winter used them for the transportation of potatoes to market, only requiring fire in the severest weather.

Some years later other roads built and used the refrigerator cars. The improvements and general use within the past 10 or 15 years are well-known to the public.

It is interesting to look back on the progress of railroading and the small beginnings which have resulted in great things, and there is yet progress to be made. We are not yet near the meridian of railroad management; much has yet to be accomplished to bring up the science of railroading to a higher plane for public benefit, and a fair return to those who pour out their money for the building of railroads. When the writer—41 years ago—began railroading, and a few years later was connected with its management, everything relating thereto was in its infancy. It was all experiment with us, no precedents to guide, or to even consult and choose the best.

While vast improvements have been made, may not some have overshot the mark and introduced too much "red tape," and made the operator too much of a machine, so that when they have been engaged for years in their business they have not advanced a whit from the starting point? Is it not better to place a responsibility that he can bear on every employé, so that he will feel that he is a man, thereby creating an interest in his work that he otherwise, as a machine, will never feel, his only interest in fact being in signing the pay roll. Employés are men, and men of ideas, and the most successful railroad men are largely indebted to their men for their success. There is no danger in a railroad manager's having too good men. His success depends on their aid.

J. WILDER.

The Proper Lead for Turnouts.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Will Mr. W. O. Lelime be kind enough to give me the following information, as I am somewhat undecided in the switch business, and would like to have a few facts to push me in the right direction:

1st. Is 95 ft. the lead for a No. 10 frog, for a stub switch as well as a split switch?

2d. Does the point of the split switch represent the theoretical point of the turn-out curve?

3d. How is the split rail made: straight, or to a curve having a radius of 950 ft., as mentioned by him?

4th. Is that part of the frog, commonly known as "toe" to point, made straight, or curved to a radius of 950 ft.?

INQUIRER No. 2.

TO THE EDITOR OF THE RAILROAD GAZETTE:

If "W. O. Lelime" had known that 18 ft. from the P. C. of the turn-out curve, or heel of point switch, the distance from the gauge of the main track rail to the outside of the switch rail is generally about 3 or about 5¼-in. gauge to gauge, he would have seen that "Inquirer's" criticism was well founded. The criticism, however, is not applicable to the Pennsylvania Railroad alone, but can be applied to roads using the point switch and full length theoretical curve.

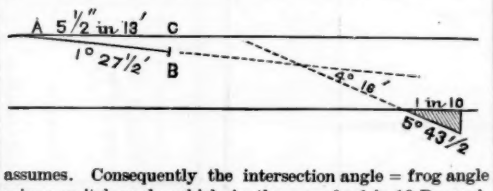
D.

[At three-tenths of the lead from the P. C. of the turnout curve, at rest at any fixed distance, the deviation of the turn-out curve from the main line is 5 in. At the same distance from the frog-point comes the crotch-frog, the number of which is seven-tenths of main frogs. It is not strictly correct to make the lead of point switches the same as for stub switches, since the point is rather a tangent to the theoretical curve, and the lead should therefore be shortened by the length of the tapered part of the point rail; but the bottom fact in regard to the whole of this continual discussion in regard to the proper leads of switches is that a difference of 5 to even 10 per cent. in the length of turn-out curves is of no mortal importance, for reasons elsewhere summarized.—EDITOR RAILROAD GAZETTE.]

TO THE EDITOR OF THE RAILROAD GAZETTE:

I notice that my inquiry relative to the radii of curves in the Pennsylvania Railroad standard switches has brought an answer from W. O. Lelime, who expresses much surprise that I should make such an inquiry, and not be familiar with the simple formula, "2 gauge × No. of frog," etc., etc.

With all due respect to Mr. Lelime, I would say that his formula does not apply in the cases referred to, for the reason that the curve is sprung from *B* and not from *A*, as he



assumes. Consequently the intersection angle = frog angle minus switch angle, which in the case of a 1 in 10 Pennsylvania standard switch would be 5° 43½′ less 1° 27½′ = 4° 16′, instead of 5° 43½′, as assumed by Mr. L.

The attempt to fit in a curve 950 ft. radius, where a curve of shorter radius should go, causes the "bunching" near the frog that I referred to. This would not be so if the lead were shortened up to fit the curve.

With reference to placing a short piece of "straight" next the frog, I consider this of considerable importance to make a smooth riding cross-over, although Mr. Lelime considers this a useless refinement.

W. H. P.

The Railway Car Accountants' Association.

The Committee on Distribution of Cars of this Association has issued the following circular, dated Baltimore, Md., April 25, copies of which have been sent to railroad managers generally:

How to handle the freight equipment of railroads so that the greatest service possible can be gained from it and unnecessary delays reduced to a minimum has long been a question that has engaged the attention of railroad managers. The large amount of capital invested in freight cars and the importance of having the greatest number possible at command during busy seasons, as well as their retention in proper business, makes it a question worthy of the most careful consideration.

Recognizing this fact, the Railway Car Accountants' Association, at its annual meeting in Richmond, 1884, appointed a committee to thoroughly inquire into the manner of distributing cars, and report a plan. This committee after a year of careful investigation, which covered the most advanced roads, made their report at the annual meeting of 1885. Copy of the report is inclosed, to which we respectfully invite your attention.

The recommendations contained therein are the result of much reflection and investigation, and as they are endorsed by some of the most experienced railroad managers, we hope you will find them not unworthy of your consideration. It is not in a dictatorial spirit that we bring this question to the notice of railroad managers. Our aim is to lay before them what a careful investigation has led us to believe to be the most improved method, feeling confident that they will not be slow to adopt a system, which experience has shown to be a great improvement over the present method.

As we are obliged to report the result of our labors to the annual meeting, which will be held in Buffalo, June 15, will you kindly favor us with your views as to the adoption, by your line, of the system recommended.

Respectfully,

D. F. MARONEY.
A. W. DAVIES,
C. J. FELLOWS,
C. H. EWINGS,
M. SWEENEY,
} *Committee.*

Please address your reply to D. F. Maroney, Chairman, care of Baltimore & Ohio Railroad, Baltimore, Md.

The report presented by the committee last year, to which reference is made in the circular, is as follows:

REPORT OF THE COMMITTEE.

Your committee appointed at the meeting held in Richmond, Va., in May, 1884, to inquire into the manner in which cars are distributed and to submit a plan covering this service, beg to report that they have given the subject careful attention and consideration, and submit the following as a result of their deliberations:

They have found that when the distribution of cars between divisions is performed by an officer having matters other than car service to engage his time and attention, the service suffers, for the reason that he is often so busily engaged with other affairs that he cannot give the matter of car distribution the close application that it requires.

On many roads the distribution of cars is looked after by the general manager, whose time and attention is so much engaged with questions of construction, operation, etc., etc., that he can, at the most, but give a hasty consideration to distribution. The same is the case when he entrusts it to his clerk, who has other duties to perform.

Other roads leave distribution entirely in the hands of the division superintendent; the result is that each looks out only for himself, totally disregarding the needs of the other divisions, when he thinks they conflict with his own.

On the roads having but one person to distribute cars between divisions whose time is entirely devoted to matters pertaining to car service, and with the car service immediately under his control, it was found that the service was more efficient and satisfactory, the system being more perfect and methodical.

In regard to local distribution on divisions made up of several smaller ones, or districts, it was found that the service was less satisfactory when the distribution between stations was performed by the division superintendent, than when performed by the train dispatcher of each district, working under the direction of the division superintendent.

It was further found that foreign cars are often unnecessarily detained for lading on account of the lack of proper information concerning the lading originating at all points. Where reports were furnished showing in detail the foreign cars on hand, also the lading for the following day, as far as known, foreign cars were handled more economically, and with less detention.

The system of distribution that your Committee would recommend is as follows:

1. That the distribution of cars between divisions and foreign roads be put in the hands of one competent person, viewing the whole line impartially, working under the direction of the general manager or general superintendent, as the case may be, with no duties to perform but those pertaining to car service, and that the car service office be made a part of his office, and entirely under his control.

2. That the distribution of cars between districts of divisions be performed by the superintendent of division.

3. That the distribution of cars between stations be in the hands of the train dispatcher of each district, working under the direction of the division superintendent.

4. That in connection with the usual report of home cars furnished, one be made showing the number (not numbers) of each initial, and kind of foreign cars on hand loaded, wanted and available, and also the character of the lading for which cars will be wanted the following day, and to what territory destined.

Your Committee have refrained from submitting forms of blanks covering this system of distribution, recognizing as they do, that what would meet the requirements of one road would not be entirely suitable for another.

Appended are the views of the general managers of a number of railways on the question of consolidating the distribution of cars and car records under one head, all of whom have demonstrated by practical experience its necessity, in order that the full service might be had from the equipment, and whose views on account of their long and valuable experience in the management of railways are worthy of the most careful consideration.

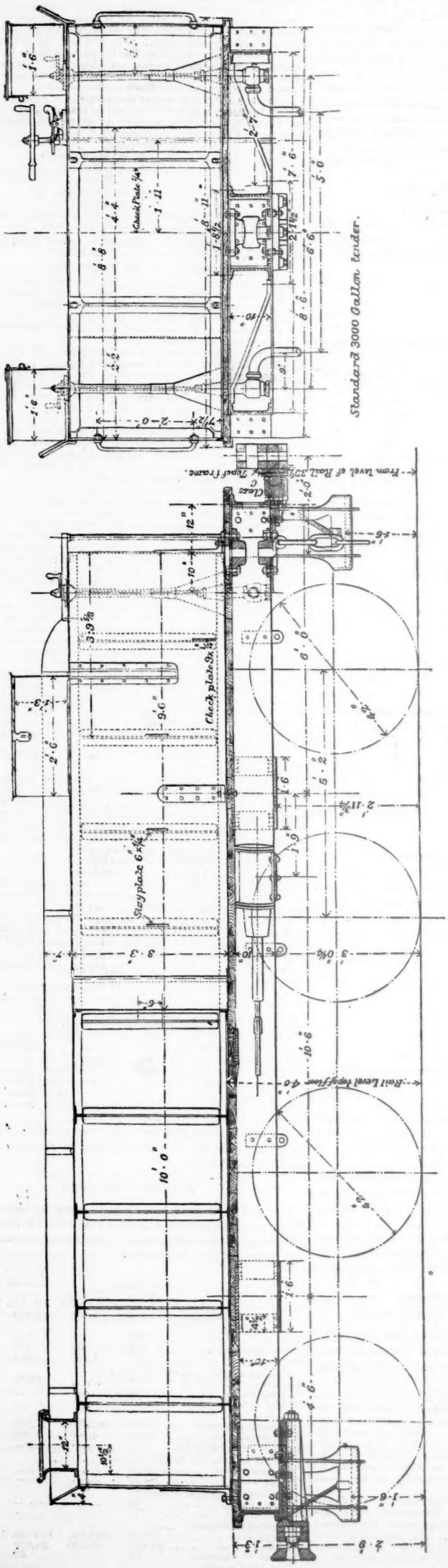
The letters appended are from the managers of many prominent lines, and generally approve the recommendations made by the Committee.

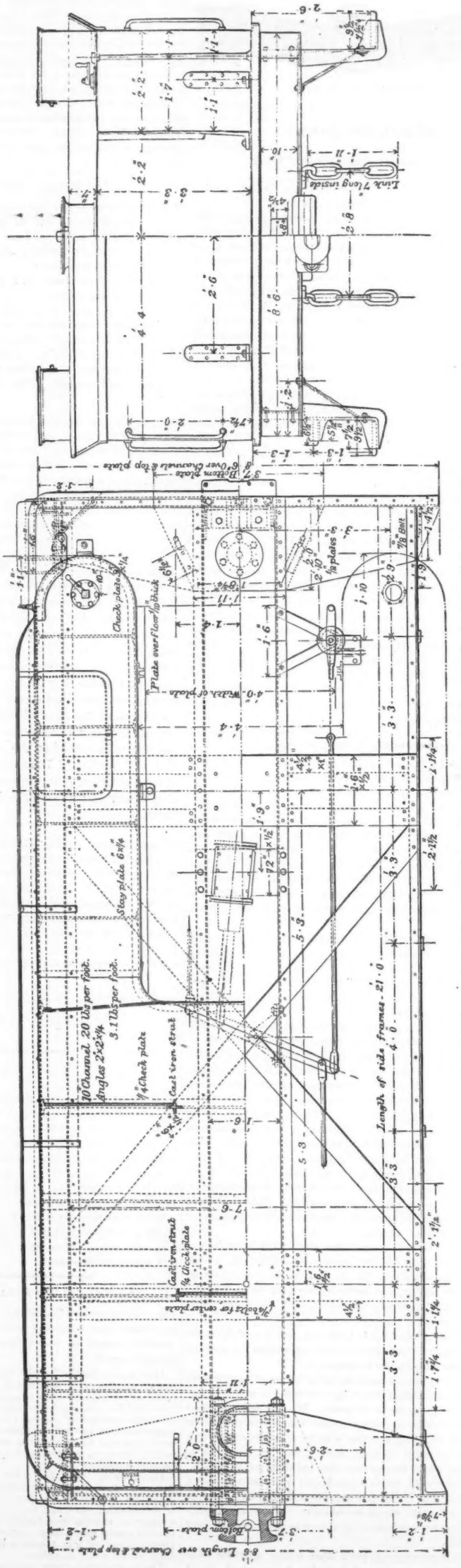
Australian Railroads.

The following data are from a paper by Mr. George Downe, Superintendent of Motive Power of the New South Wales Government Tramways, communicated to the American Society of Civil Engineers:

	New South Wales.	Victoria.	Queensland.	S. Australia. 5 ft. 3 in. and 3 ft. 6 in.
Gauge	4 ft. 8½ in.	5 ft. 3 in.	3 ft. 6 in.	3 ft. 6 in.
Miles worked, 1884	1,432	1,655	1,123	1,003
Rolling stock:				
Engines	336	305	125	118
Passenger cars	776	702	142	222
Freight cars	6,938	4,797	1,865	2,980
Average weight, tons of 2,000 lbs.:				
Engines	59.0	.....	22.25	38.6
Passenger cars	9.8	.....	.....	8.7
Freight cars	5.6	.....	.....	3.98
Train miles:				
Per engine per year	19,100	22,400	17,500	14,650
Per mile per year	4,480	4,140	1,950	1,729
Average each way daily	6.15	5.67	2.67	2.37
Pounds dead weight to 1 lb. of load:				
Passenger trains	25.32	.....	.....	25.00
Freight trains	3.62	.....	.....	2.75
Average tons weight of train:				
Engine	59	.....	.....	38.60
Train	111	.....	.....	78.40
Working expenses:				
Per train-mile	99 cts.	90.6 cts.	83.2 cts.	104.5 cts.
Per mile of road	$4,410	$3,750	$1,620	$1,805
Per cent. of earnings	63	.....	53	67
Cost per ton-mile:				
Train and load	0.58 ct.	.....	0.80 ct.	0.88 ct.

The last figures, counting the cost per ton of train and load


Standard 3000 Gallon tender.
Check Plate ¾"
Class C
Steel Truck
Check plate 3x¾
Step plate 6"x¼"
Rail Level top of floor
Rail Level of Rail
Frame
Truck Frame


Link 7" long inside
Plate over floor ¾" thick
Check plate ¾"
Step plate 6"x⅝
Channel 20 lbs per foot.
Angles 2"x2"x¼"
3.1 lbs per foot.
¼" Check plate
Cast iron strut
Length of side frames 21' 0"
Cast iron strut ½ thick plate
¾" bolts for center plate
Bottom plate
8'6 Length over Channel & top plate
STANDARD 3,000-GALLON TENDER, NEW YORK, WEST SHORE & BUFFALO RAILROAD.
Designed by the Late HOWARD FRY, Superintendent of Motive Power.

to be the same and the weight of train the same for passenger and freight trains, would make the cost per ton of freight per mile 2.67 cents and per passenger mile 15.27 cents in New South Wales, and 3.30 cents per ton mile and 22.9 cents per passenger mile in South Australia. This greatly exaggerates the cost per passenger mile, but any reduction of that must increase the cost per ton per mile.

Australia is the only country in the world, except Canada, which has a larger railroad mileage in proportion to population than the United States.

Standard 3,000-Gallon Tender, New York, West Shore & Buffalo Railroad.

This tender was designed by the late Howard Fry, Superintendent of Motive Power of the New York, West Shore & Buffalo Railroad, and is an excellent example of careful design and substantial construction. These tenders have done very well, the only alteration required in their construction after several years running being the substitution of larger axles. The axle shown in the drawings is the old M. C. B. standard, which measures 3¾ in. diameter in the centre. This was found too weak, and the new M. C. B. standard substituted. This measures 4¼ in. diameter in the centre, the journals, etc., being unchanged, and is found amply strong enough.

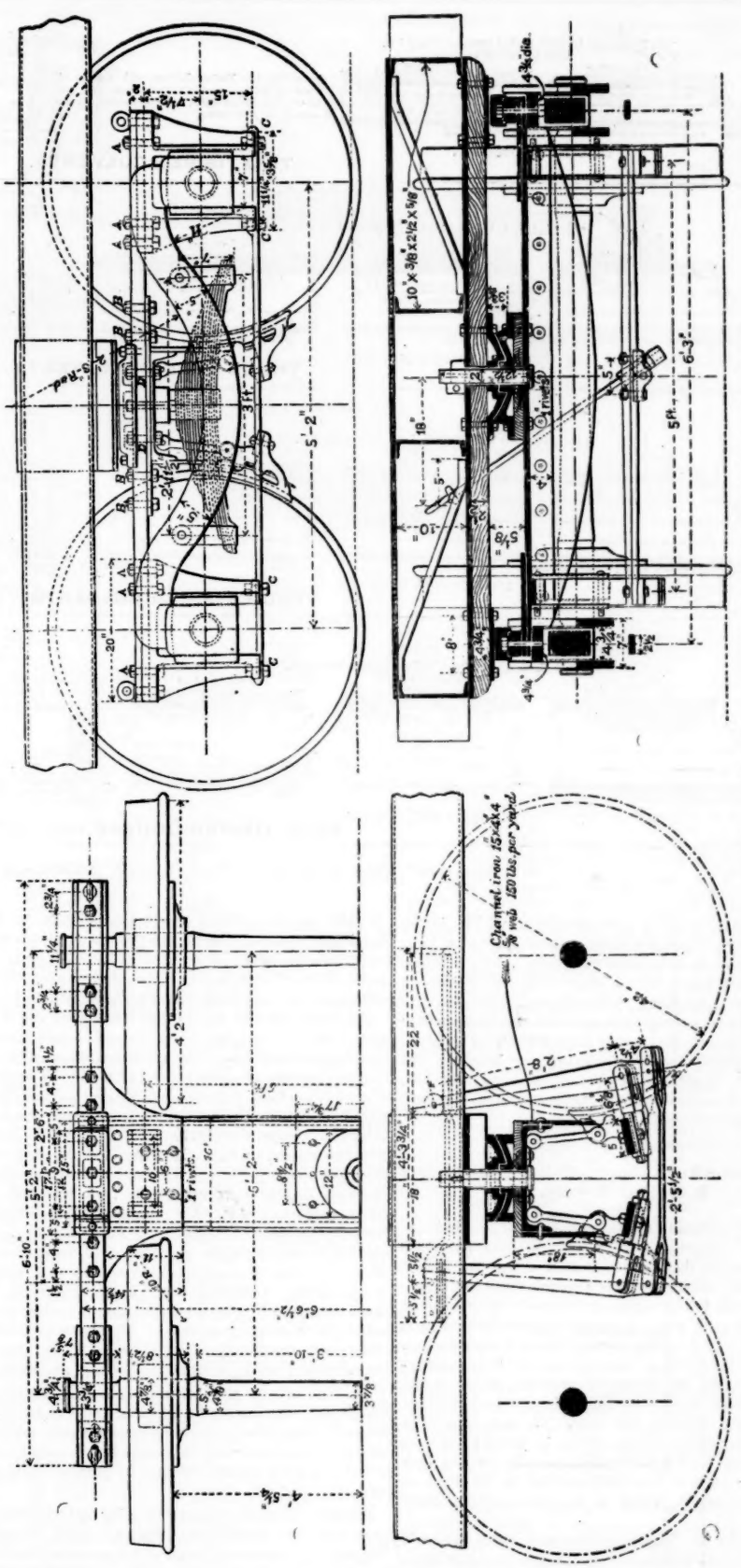
The tender frame is composed wholly of iron, and is remarkably strongly proportioned and well designed. The tank is of the usual horseshoe form, and is bedded on planking, and held down by six knees riveted to the tank, and each bolted to the frame by a ⅞-in. bolt. The tank manhole is a casting, and the sides, top and bottom of the tank are stiffened by tee irons placed at 2 ft. centres braced at the corners by 5 in. by ¼ in. gusset stays. The hind end of the tank is stiffened by three vertical tee irons, which are not, however, gusseted to the top or bottom plates. The weight of the coal on the flat top of the tanks is taken by four vertical cast-iron pillars of cruciform section, fastened top and bottom to the T-iron stiffeners. Three large check plates are fastened to these pillars, and to the sides of the tank, to prevent a rush of water when a quick stop is made, and check plates are also placed near the feed pipe strainers. The tank is made in very few plates—sixteen in all—the back being in one plate 11 ft. long, and each of the sides in one plate 16 ft. 10 in. long. The thickness of plates and pitch of rivets, etc., are as under:

Top and bottom plates	¼ in. thick.
Inside leg plates	7-32 in. thick.
Sides, ends and coping plates	7-32 in. thick.
Angle irons, 4 lb. per ft.	2 in. by 2 in. by 5-16 in.
Tee irons	4 in. by 3 in.
Pitch of rivets in angle irons on top	1½ in.
Pitch of rivets in angle irons on side	1¼ in.
Pitch of rivets in angle irons on bottom	1¼ in.
Rivets in tee irons and stays	½ in. dia.
Rivets in tank	⅝ in. dia.
Lap of plates	1½ in.
Shoveling plate	1-10 in. thick.
Coping angle iron, wood platform	2 in. by 2 in. by ¼ in.

The frame is composed of four sills or longitudinals of 10 in. by ⅝ in. by 2½ in. by ⅝ in. channel iron braced together diagonally by two flat plates 6 in. by ½ in. The end sills are also of channel iron of the same section, stiffened by deep ½-in. plates. The weight is put on the trucks by heavy transoms, each composed of two plates 18 in. by ½ in., with diagonals of the same area in cross section. It will be noticed that the horizontal centre line of the frame is above that of the draw-gear, a disadvantage common to all American rolling stock; but apparently, in this case, a little scheming would have enabled the frame to be lowered sufficiently to make the centre lines coincide, thereby strengthening the frame, and enabling much of the heavy draw-gear casting to be dispensed with. In the coupling between engine and tender the draw-link is above the buffing plate or "bumper," an arrangement which, though nearly universal, is nevertheless objectionable. A wedge between engine and tender bumpers keeps the coupling tight, and prevents rattling and oscillation. The hind draw-gear casting or bull nose is secured by two 1⅝-in. bolts, thus fully equaling the strength of the link, pin, knuckle, etc., of any ordinary draw-gear.

The truck is also of very simple and strong construction. The brake blocks are applied only between the wheels, and are hung from a stout truck transom composed of a 15-in. by 4-in. channel iron, laid horizontally with vertical ½-in. plates riveted to the flanges, the whole making a species of fish-bellied girder. The whole frame is kept square by ½-in. gusset plates, fastened to the channel iron transom and main bar frame by 1-in. rivets and bolts respectively. The springs are 3 ft. span, and are composed of 15 plates 3½ in. by ⅜ in. The front tender truck carries the weight on the centre and the hind truck on the side bearings immediately above the springs. It will be noticed that the height of the centres can be adjusted by the wood packing. The passenger tenders have 42-in. wheels, and the freight tenders 33-in. wheels, but the same tank, frame and truck centre is used for all classes. The brake blocks are made in two pieces, the cast-iron block is attached to the brake beam and hanger, and the shoe, when worn out, can be detached by withdrawing a curved taper pin which passes through lugs on block and shoe and locks them together. The brake beams are plain iron bars, measuring 5 in. by 1 in. at the centre and tapering to 3½ in. by 1 in. at the ends.

The axles are the M. C. B. standard. As before explained the tenders were built with axles 3¾ in. diameter in the centre, but as these showed signs of weakness, they were replaced by the new M. C. B. standard, measuring 4¼ in. in the centre. The journals, 7 in. by 3¾ in., remain unchanged, as the bearing surface appears to be ample. The total journal area supporting the tender is, therefore—multiplying number of journals by diameter and length of each—8 by 7 by 3¾ in. = 210 square inches. The bearing area of an ordinary English main line tender carrying 3,000 to 3,600 gallons (of 231 cubic inches), and having six wheels and 9 in. by 5 in. journals, is 6 by 9 in. by 5 in. = 270 square inches, and therefore the pressure per square inch of bearing surface would be about the same in either case.



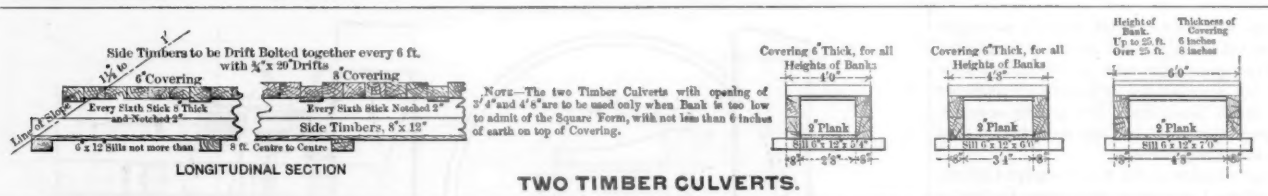
Foreign Railroad Notes.

A former railroad employé, writing from Australia, says that severe economy is the order of the day on the Australian railroads. The great drought made the wheat crop last winter so small that not more than 50,000 tons can be exported, against 300,000 last year, and has also greatly reduced the number of cattle that can be sent to market. This has greatly reduced the traffic and earnings of railroads. The train-service has been reduced as much as possible. In the railroad shops the men are put on three-fourths time, working 4½ days a week; men in superior places have been given lower positions for the time, and enginemen, firemen and cleaners, like the men in the shops, have been put on three-fourths time. Matters have been arranged to keep the men, so far as possible, on the reduced time, and some new privileges have been given; as where men lived in a town whence they rode to the shops on the railroad, paying $2.43 for a monthly ticket, they are now carried free.

At a recent letting of a contract to supply the Prussian State Railroads 225,000 tons of coal for locomotives, the bids ranged from 4.76 to 6.40 marks ($1.16 to $1.55½). It is to be delivered at intervals from July 1 next for twelve months.

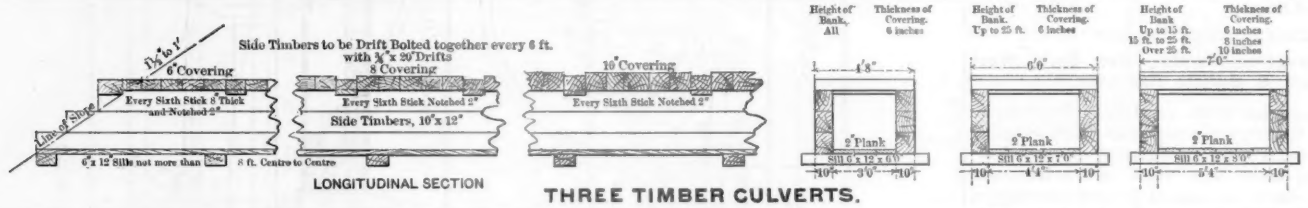
The Prussian State Railroads have been guilty of a glaring discrimination in rates, which reminds one that traffic takes very much the same course in all countries. The North German Lloyd and other ocean steamship lines found that they could get English coal at Southhampton cheaper than Westphalian coal at Bremen or other German ocean port, but agreed to take the Westphalian coal if the State Railroad would carry it from the mines to the port for 4½ marks ($1.09) instead of the regular rate of 5 marks ($1.21). The railroad management actually reduced the rate 7 cents, the mines knocked off 2½ cents, and the steamship company conceeded the other 2½ cents, the result of which is that the mines prevent an order for 250,000 to 300,000 tons of coal per year going to England, and the State Railroad keeps the carriage of that amount; but the steamship men get their coal carried at rates lower than is charged anyone else.

The international interchanges of through freight have now become so great in Europe that the differences in languages are more troublesome than formerly, when nearly all freight was transferred at the frontier, where it was always a necessity for many employés to speak two languages. Now a considerable traffic between England and Italy goes by way of Belgium, Alsace-Lorraine, Switzerland and the Gotthard


Side Timbers to be Drift Bolted together every 6 ft. with ¾"x 20" Drifts
1½" to 1'
Line of Slope
6" Covering
Every Sixth Stick 8" Thick and Notched 2"
8" Covering
Every Sixth Stick Notched 2"
Side Timbers, 8"x 12"
6"x 12" Sills not more than 8 ft. Centre to Centre
LONGITUDINAL SECTION
Covering 6" Thick, for all Heights of Banks
4'0"
9" Plank
Sill 6"x 12"x 5'4"
2'8"
Covering 6" Thick, for all Heights of Banks
4'8"
9" Plank
Sill 6"x 12"x 6'0"
3'4"
Height of Bank. Thickness of Covering.
Up to 25 ft. 6 inches
Over 25 ft. 8 inches
6'0"
2" Plank
Sill 6"x 12"x 7'0"
4'8"

Nota—The two Timber Culverts with opening of 3'4" and 4'8" are to be used only when Bank is too low to admit of the Square Form, with not less than 6 inches of earth on top of Covering.

TWO TIMBER CULVERTS.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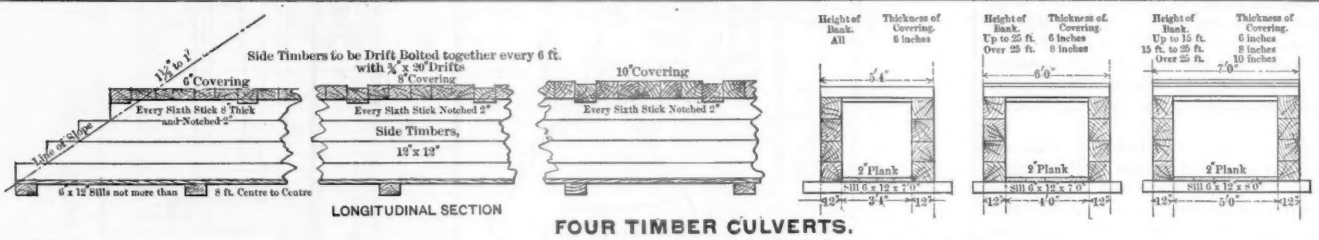
Every Sixth Stick Notched 2"
6"x 12" Sills not more than 8 ft. Centre to Centre
LONGITUDINAL SECTION
Height of Bank. Thickness of Covering.
All 6 inches
4'8"
9" Plank
Sill 6"x 12"x 6'0"
3'0"
Height of Bank. Thickness of Covering.
Up to 25 ft. 6 inches
6'0"
9" Plank
Sill 6"x 12"x 7'0"
4'4"
Height of Bank. Thickness of Covering.
Up to 15 ft. 6 inches
15 ft. to 25 ft. 8 inches
Over 25 ft. 10 inches
7'0"
2" Plank
Sill 6"x 12"x 8'0"
5'4"

THREE TIMBER CULVERTS.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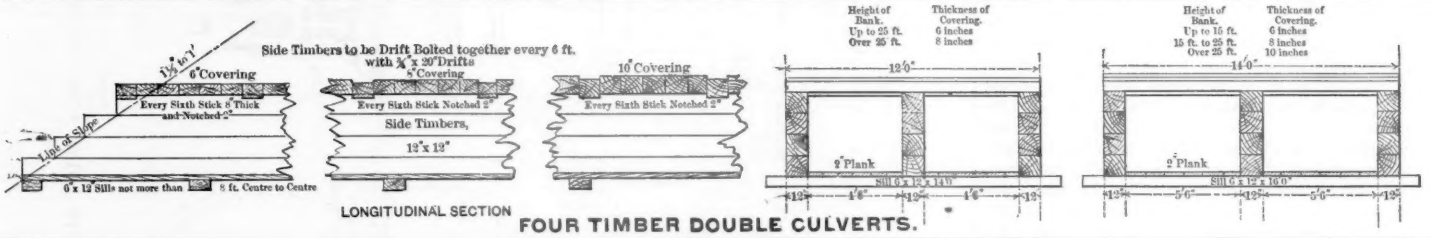
10" Covering
Every Sixth Stick Notched 2"
6"x 12" Sills not more than 8 ft. Centre to Centre
LONGITUDINAL SECTION
Height of Bank. Thickness of Covering.
All 6 inches
5'4"
2" Plank
Sill 6"x 12"x 7'0"
3'4"
Height of Bank. Thickness of Covering.
Up to 25 ft. 6 inches
Over 25 ft. 8 inches
6'0"
2" Plank
Sill 6"x 12"x 7'0"
4'0"
Height of Bank. Thickness of Covering.
Up to 15 ft. 6 inches
15 ft. to 25 ft. 8 inches
Over 25 ft. 10 inches
7'0"
2" Plank
Sill 6"x 12"x 8'0"
5'0"

FOUR TIMBER CULVERTS.


Side Timbers to be Drift Bolted together every 6 ft. with ¾" x 20" Drifts
1½" to 1'
Line of Slope
6" Covering
Every Sixth Stick 8" Thick and Notched 2"
8" Covering
Every Sixth Stick Notched 2"
Side Timbers, 12"x 12"
10" Covering
Every Sixth Stick Notched 2"
6"x 12" Sills not more than 8 ft. Centre to Centre
LONGITUDINAL SECTION
Height of Bank. Thickness of Covering.
Up to 25 ft. 6 inches
Over 25 ft. 8 inches
12'0"
2" Plank
Sill 6"x 12"x 14'0"
4'6"
4'6"
Height of Bank. Thickness of Covering.
Up to 15 ft. 6 inches
15 ft. to 25 ft. 8 inches
Over 25 ft. 10 inches
14'0"
2" Plank
Sill 6"x 12"x 16'0"
5'0"
5'0"

FOUR TIMBER DOUBLE CULVERTS.

STANDARD TIMBER BOX CULVERTS—CHICAGO, MILWAUKEE & ST. PAUL RAILWAY.

Tunnel, necessitating much correspondence, which, in accordance with the present custom, is conducted in the language of the place from which the letter is written. About a single consignment of freight there are often documents in English, French, German and Italian. It has been proposed lately to make French the common language for international traffic; but this would require that a very large number of railroad men who have little other occasion to use any language but their own should be able not only to read but to write French, which requires a knowledge of the language which comparatively few readers of French possess.

Standard Timber Box Culverts, Chicago, Milwaukee & St. Paul Railway.

There is a strong feeling among engineers, which finds expression in the construction of nearly all lines on which timber is used at all, that the use of timber box culverts is bad practice; that where the fill is not over 6 or 8 feet high—or sometimes even 10 feet high—open timber culverts should be used instead, and where the fill is too great for such open culverts, pile or timber trestles should be used, or else masonry. The practice of the Chicago, Milwaukee & St. Paul is different from this, on all the thousands of miles which it has built or is building, where stone cannot be obtained at all, or only with much difficulty and cost. In such cases, the rule on that line, even in timber work, is never to use an open culvert when timber can be used instead. In this it is not alone, but we believe it is fairly entitled to the credit of having set the fashion, which is not yet a very general fashion.

It is defended by the following argument: That though it is true that the wood decays, and though it is true that there is somewhat less certainty of knowing of dangerous decay in advance, yet it is not true that decay is more rapid than with open structures, nor that they are as likely to give way when they are decayed, nor that the consequences are likely to be so serious if they do give way. In the meantime the average condition of a poorly ballasted or wholly unballasted track is very much better than with open structures.

Therefore, the practice on that line is to use timber box culverts wherever possible, to have them inspected periodically and carefully, and whenever their condition demands it and convenience serves, to renew them, not with stone but, as a rule, with iron pipes. It is not found in practice, however, that even a considerable amount of decay endangers caving in of the bank greatly, especially when the bank is of some considerable height. After the bank has once become solid, on the contrary, which of course is long before the timber begins to decay seriously, it is found that they very seldom cave in, and that in putting in the iron pipe the timber may be almost completely cut away at top, bottom and sides for the insertion of circular pipes without danger; a safe indication for the workmen being that wherever the timber is punky and rotten there can be no immediate danger in removing it altogether, and after the expiration of very much less than 15 or 20 years, which is no unusual time for these culverts to remain in service, all the interior of the wood at least where it is exposed to the air, is pretty sure to be punky and rotten, its chief and all-sufficient function seeming to be to sustain the pressure of earth during the process of solidification only, and thereafter chiefly to protect the interior surface of the earth fill from the influence of the atmosphere, which alone suffices to restrain all considerable tendency to cave.

It follows that the size of the iron pipes which are ordinarily used for renewal, when it is not clearly safe to use a smaller pipe, will be given by determining with a pair of dividers the largest circle which can be drawn within the exterior limits of the culvert walls without cutting away more than half or two-thirds of the thickness of the wood at top or sides at any point, the greatest liberties being taken of course with the bottom timbers. In doing this, the first section of the pipes is entered at one end and drawn clear through to the other end by appropriate tackle, the workmen clearing away in advance of it. After the first pipe has been drawn through and placed in position, the following pipes are drawn up to it in succession, one after another, very speedily, and the whole work is complete. A masonry end may or may not be added. The pipes used range from 24 to 60 in. in diameter, and are cast at the company's foundry of any scrap which comes convenient. They are provided with a simple bell mouth large enough merely to hold the pipes in line with each other, without any attempt at calking.

The sizes of pipe used, of course, depend largely on what has proved to be the requirements of the water way. When the culvert has been in use some years the presumption is fair that no larger water way than before is necessary, and this, or even more, is readily obtained by pipes in the manner described.

Whether or not this manner of using and renewing wood is good and safe practice is simply a matter of experience. Experience in almost all kinds of soil appears to indicate that it is, a notable advantage being that in the rare cases where culverts cave in they do not, as a rule, produce a dangerous disturbance of the surface, whereas if an open culvert or trestle has been carelessly allowed to become too weak, an accident is almost certain, while it is almost impossible to make a new track with many open structures in it ride even fairly well.

There is perhaps no detail of American practice in which foreign critics accustomed to new lines made thoroughly solid and complete before they are allowed to be opened, are more apt to comment unfavorably than on the practice of opening first with temporary works, and completing with permanent works afterwards, which may be called the standard American practice. Yet there is much to be said for this—so much that it may fairly be said to be the duty of the engineer in almost all cases, where there is not a certainty of abundant means for completion, and a certainty that the cost of the permanent works will not be materially increased if they are executed at once. Even in such a case as the West Shore, where the utmost perfection of construction would have seemed to be justified, if anywhere, had this policy been adopted in part at least, the financial results to the unlucky investors of that line might possibly have been different. Of thousands of miles of a less exacting character which have been constructed in the past, this is still more true.

The advantage is not simply in the saving in immediate outlay and in time of opening, although these two considerations alone are of immense importance, but there are at least three other considerations of often greater weight:

First.—The exact requirements of the locality become better known, and costly and dangerous mistakes may be more fully avoided.

Second.—The work can be prosecuted in a more leisurely manner and at more appropriate seasons, and thus greater durability insured.

Third.—The work can be prosecuted more cheaply, there being the advantage of locomotive power for delivering stone, cement and iron work, and for making fills by trains; often at but a fraction of the cost of executing the permanent works in advance of these facilities.

As for safety, there is no question but that wooden structures, properly designed and properly watched and renewed, are entirely safe, and the thing to be protested against therefore is lack of care and skill in using them and not the things themselves. The difference in the cost of a good and of a bad wooden structure is not so great that there is ever any excuse for the latter, though it must be admitted that they are far from unknown.

For these reasons there is no apology demanded for the reasonable and cautious use of the practice of "opening roads first and building them afterwards," as it has been called, even when, as on the Chicago, Milwaukee & St. Paul and thousands of miles of other road in the West, the use of stone structures for opening the road is wholly out of the question.

J. A. Fay & Co.'s Large Automatic Railway Cutting-off Saw.

This is a recently patented machine with iron tables and power feed, designed for cutting off the large timbers and material required in car, bridge and ship construction.

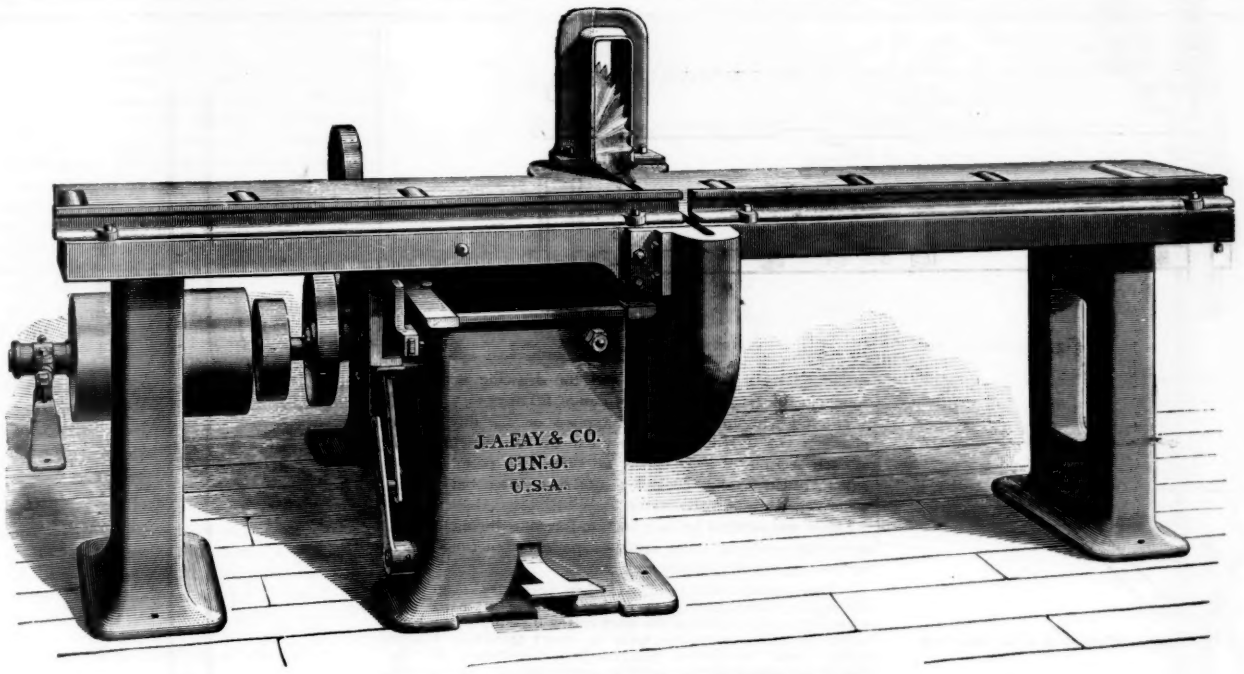
The frame is of very heavy cored section, cast in one piece.

The arbor carrying the saw is journaled in bearings on a sliding carriage, which is mounted on shears on the frame, and receives its power from a driving pulley upon the countershaft at the end of the machine.

A balanced vibrating frame is hung to the bearings of the countershaft and connected to the saw carriage, which latter is moved back and forth by an endless chain, driven by friction. This arrangement permits it to be advanced forward, at a regular speed for cutting off, by pressure upon the treadle, and as soon as the foot is released, the carriages will return with a speed triple that with which it was advanced.

The novel feature of this machine is the traversing of the saw carriage by friction, so that the rate of advance is always under control of the operator while the saw is running, and it can be automatically stopped in either direction, a stops are provided for regulating the distance of its travel when it is desired to cut off a large number of pieces of a certain size.

The fence is constructed with T slots for the reception of a T-gauge, and adjustable to any desired point along its



LARGE SIZE AUTOMATIC RAILROAD CUTTING-OFF SAW.

Made by J. A. FAY & Co., *Cincinnati, O.*

length. When the machine is running, and there is pressure upon the foot-treadle, the carriage remains at the extreme distance from the fence. A scale is marked on the top of the fence to aid the operator in cutting off pieces to accurate lengths.

The saw-carriage may be started or stopped at any point intermediate from the point of its travel, and the speed of its movement is also governed by the foot lever to suit different kinds of work. By pressing hard, the full speed is obtained when sawing light work; by giving a lighter pressure, the speed may be lessened.

The saw-arbor runs in patent self-oiling bearings and has an expansion device for allowing the use of saws of various size holes without the necessity of bushing. A saw-guard or shield conveys away the sawdust and also affords protection to the operator.

The Tornado in Minnesota.

The *Scientific American* contains an interesting account from an eyewitness of the tornado which recently wrecked part of the town of St. Cloud, Minn., and destroyed numerous buildings, etc., in that vicinity, causing great loss of life. The following extracts will probably be interesting to our readers:

Both cyclones and tornadoes move vertically around an advancing centre, the motion being from right to left, or in a direction opposite to that of the hands of a watch, and both are violent agents of destruction and objects of dread. The true cyclone starts with a diameter of from 50 to 300 miles, spreading as it advances to one of from 500 to 3,000 miles. Its usual birthplace is amid the the tropics, and its fury is exhausted before it reaches this more nothern realm. Moving over a large body of water, it piles up mighty tidal waves that finally inundate the land. The tornado, on the other hand, is purely a local affair, originating in some collision of opposing storm currents, assuming a funnel-shaped form, its tail now touching and then rebounding from the earth, and again sweeping along over it like a huge wet blanket, but its greatest diameter rarely exceeding 500 yards. Thus it proceeds in a serpentine way for from a few rods to 25 or 30 miles, when it bursts in some sort of local storm of rain or hail. Should it strike the water, it then becomes a waterspout, as was demonstrated in the case of a tornado in 1883, that swept out of Wisconsin upon Lake Michigan, causing a great commotion there and lifting a column of water some 300 feet high.

Lieut. Finley, in his book, "Six Hundred Tornadoes," gives particulars of tornadoes in the Northwest and other parts of the United States, but probably none of the long list exceeded in its destructive energy the tornado at St. Cloud and Sauk Rapids, Minn., on April 14. Being on the outskirts of the storm, I only saw the massing of black clouds, followed by a spiteful hail, many of the stones measuring more than an inch in diameter; but subsequently I visited the locality, making inquiries of eye-witnesses, and following the tornado's track for several miles, and noting its varied effects.

During the day the thermometer rose to 80 deg., and the air was sultry and oppressive. At 3 p. m. dark banks of straggling clouds overhung the ridge marking the old river limit, and there were apprehensions of impending danger. Suddenly the clouds began to revolve, while sharp points shot downward, until a whirling funnel-shaped mass was formed above a basin amid the hills, that seems to have furnished the cradle for the ensuing tornado. Its first condition was undoubtedly that of a simple whirlwind, having a diameter of about 1,000 feet, which uprooted or twisted off nearly every tree in its circle, overturned the monuments in the adjoining Masonic cemetery, and tore up the bowlders from the ground. Thence it moved slowly and majestically along, at the rate of about 12 or 15 miles an hour, but with an inconceivably rapid rotary motion upon its vertical axis, confining itself for some distance to a path hardly more than 150 ft. wide. The pyrotechnic display of flaming colors against a background of sooty blackness was very impressive and wonderful. Hundreds of people took timely warning and got out of the road of the moving column of cloud, whose general trend was toward the northeast. Having wrecked the Catholic church on Calvary Hill, and also several farm houses, it entered a portion of the city of St. Cloud mainly occupied by foreigners, whose frame cottages were strewn over the plain indiscriminately, leaving nothing but the cellars to mark the site of the houses.

I noticed but one exception to this general work of complete demolition, and that was of a house that had been whirled about end for end and left on its foundation as a wreck. Reaching the freight depot of the St. Paul, Minneapolis & Manitoba Railroad, the wind tore that to pieces, overturned the long lines of freight cars, carried the trucks away, and even in places wrenched the iron rails from the ties. In one instance the trucks were blown from underneath a car, dropping the latter on the track where it was left. By a merciful exemption, the hospital of St. Benedict was spared, although the houses in its vicinity were taken. The tornado left the city limits near the residence of Lieut.-Gov. Gilman, tearing away his fences and killing his horses. The total loss of life in St. Cloud was 22 individuals, mostly women and children, besides 40 or 50 more or less injured; and the total loss of property was $87,395, of which amount $50,000 fell to the share of the railroad, while the remainder was divided among 64 sufferers and their families thus rendered homeless.

The tornado struck the Mississippi River at a point opposite the village of Sauk Rapids, and fishermen who were in full view of the crossing aver that for a few moments the bed of the river was swept dry; and in corroboration of this remarkable statement they showed me a wide marshy spot where no water had been before this event took place! Two spans were torn away from the substantial wagon bridge below the rapids, one span being hurled up stream and the other down it by the rotary motion of the blast; and great blocks of granite being also torn bodily out from the piers. The large flour mill near the bridge was leveled. The depot of the Northern Pacific Railroad was demolished, and the central portion of the village itself was then attacked with the greatest violence. Being the county seat, the courthouse was located here, a substantial structure, of which only the vault, six iron safes and the calaboose were left—the latter turned upside down. A fine new school-house, costing $15,000, was completely swept away. The Epispcoal church was so utterly removed that the sole relic thus far found is a battered Communion plate. The floor of the large skating-rink is all that remains of that structure. Stores, hotels, a brewery and four-fifths of the residences in the village were scattered as rubbish along the hillsides or borne away for miles through the air. The caprice of the storm was shown here and there. The lower story of one house was removed to parts unknown, while the upper story was left on the foundation below. A large barn containing twenty mules was demolished, but the mules escaped without a scratch. A woman was lifted from her chair, carried over the walls of her roofless dwelling, and deposited in a thicket of scrub oaks several rods distant. A man told me that after getting his family into the cellar, he thought he would watch the storm for a moment; but being caught by it, he seized hold of the roots of a tree and was flopped up and down, as a carpet that is being shaken, but escaped without serious injury. An iron safe was carried by the wind completely across the street and left there as a monument of aërial energy.

The number of the killed at Sauk Rapids was 39, and about 100 were injured more or less. The fatal blows seemed to be of two kinds, either contusion about the head or stabbing by the lance-like splinters of boards whirled through the air. Many had their limbs broken by falling timbers and other heavy objects. Of sufferers still living, several are in a critical condition and may not survive. It is an instructive fact that, of those who had the presence of mind to take refuge in cellars, on hearing the roar of the approaching tornado, only one, so far as I could learn, fell a victim to its fury—a boy who was crushed by falling masonry in a part of the cellar farthest from the storm. I examined nearly every cellar in the village over which the storm had passed, and found that the portion *nearest* its direction of approach was free from rubbish, and would no doubt have proved to be a safe refuge.

An appraisement committee says that the total number of houses destroyed at Sauk Rapids, not including sheds and barns, was 109, and the total value of property destroyed was more than $290,000.

A wedding party of 30 were assembled at a farm-house about 16 miles north of Sauk Rapids. The ceremony was just concluded, when the building was struck by the tornado. The bridegroom and 15 others were killed outright, seven more victims have since died, and only one of the company escaped severe injury of some kind.

The scrub oaks had in many instances resisted successfully the onslaught that had leveled larger and nobler trees. For many miles their branches were grotesquely laden with torn garments, scraps of roofing, fragments of boards, articles of furniture, and other objects. The depot sign, "Sauk Rapids," was carried to a locality nine miles distance. A plank 14 in. wide and 12 ft. long was transported 18 miles. A hunter 28 miles north of the village told me that he saw a black cloud approaching, from which he took refuge. But it did no further harm than to shower down bits of boards, lathing, torn books, etc. He picked up a ledger which was indentified as belonging to the clerk of the county court.

I had excellent opportunity of noting, in a large open field, the proofs that the tornado traveled in a serpentine path, and with rapid rotation on its axis. Along the right hand of the general track the boards and other fragments of houses and the overturned trees were all disposed so as to point forward and inward toward the line of march. Those along the left-hand side were invariably pointed backward and away from that line. Many large splinters were driven into the ground so firmly that, using all my strength, I could not pull them out again. A farm house standing near the left-hand margin of the track had its right side intact, while on the left or outward side the windows were all broken in and the walls and roof were pierced by numerous splinters. Estimates have been made as to the rate of the rotary motion that could drive timbers deep into the soil and that could send a splintered joist, like a huge javelin, completely through the roof of a dwelling, but I know of no satisfactory mode of calculation.

Putting together the testimony of various observers stationed at different points, the width of the tornado's track must have varied from 100 to 1,000 ft.; its entire duration must have been rather less than one hour, lingering but a few moments in any one locality; and the entire distance traversed by it, from the starting point southeast of St. Cloud to the point where it burst in a heavy rainfall, considerably northeast of Rice's Station, was about 35 or 40 miles. The total loss of life thus far reported from all points was about 90 individuals, and about twice that number injured. The sum total of property destroyed could not have been less than $400,000.

Foreign Technical Notes.

In consequence of the recent fatal collision near Monte Carlo, the French Minister of Public Works has requested the French Railroad Companies to fit up all their passenger trains with continuous brakes. This applies not only to regular passenger engines and cars but to all engines, and to milk, horse and fish cars liable to be occasionally used in passenger trains. All vehicles used in fast and express trains are already fitted with continuous brakes.

Mr. Henry Mathieu, Chief Engineer of the Southern Railroad of France, found that the average yearly consumption of ties on 80 per cent. of all the French railroads for the five years ending with 1882 had been 92 per kilometre, equal to 148 per mile of track, excluding yards and sidings. Returning to the subject recently he finds in 1883 the average consumption rose to 170 per mile, and in 1884 144½ per mile, and the average for the two years 159 per mile. The French railroads are reported to have 1,450 ties per kilometre, or 2,332 per mile, which puts them 27 in. only from centre to centre, and the consumption for maintenance indicates an average life of from 13⅜ to 16½ years for the ties.

Most of the railroads report the number of ties used of each kind of wood, from which it appears that in 1883, 69.7 per cent. of them all were oak, 15.6 beech, 12.1 pine and fir, and 2.6 chestnut and other woods, but in 1884 the proportions were quite different—60 per cent oak, 22.1 beech, 15.6 pine and fir, and 2.3 chestnut, etc.

Of the total number of ties reported used, 24 per cent were imported in 1883, and 20¾ per cent. in 1884.

M. Mathieu says that the life of ties is increased one-half on the average by preservative processes; that of all the antispetics tried in France only creosote and sulphate of copper are still used, and that creosote is generally preferred. Ties of all kinds of wood are treated, though formerly it was thought not necessary to treat oak. An oak tie costing 5¼ francs [$1.05] is preserved at a cost of about a franc [19 cents]. On the Southern Railroad, where three-fourths of the ties used are of the pine that grows on the Landes, these ties cost from 36 to 38 cents each, and are preserved with copperas for 14 cents and with creosote for 19 cents each. The Orleans Railroad uses the same kind of ties, preserved

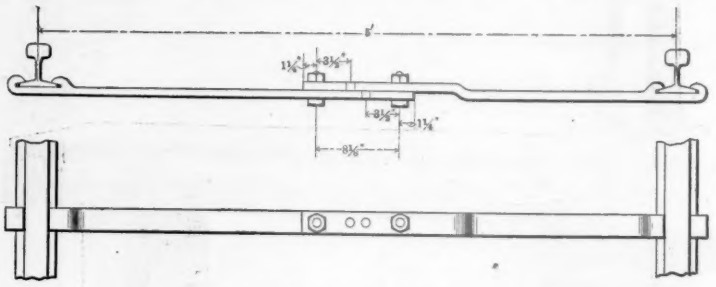


Fig. 1.—Switch Bridle—Mobile & Ohio Railroad.

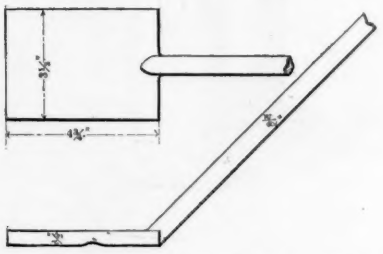


Fig. 2.—Spiking Gauge—Mobile & Ohio Railroad.

almost exclusively with creosote, for about one-sixth of its whole consumption. The Northern Railroad finds that the use of a tarred felt paper between the rail and the tie increase the life of the latter about two years.

Change of Gauge on the Mobile & Ohio Railroad.

On the last day of this month and first of the ensuing month between 6,000 and 7,000 miles of railroad (it is impossible to say exactly how many miles on these two days) will be narrowed up from 5 ft. to 4 ft. 9 in. gauge, making by far the greatest change of the kind which has ever taken place on a fixed date, and reducing the whole American railroad system to the standard gauges of 4 ft. 8½ in. and 4 ft. 9 in. with the exception of the limited and decreasing mileage of narrow-gauge lines, most of which will doubtless be, one by one, likewise changed to the same gauge. The Mobile & Ohio and the Illinois Central lines in the South have already been changed in the same way, and the details of the change on these lines will be followed in the main in the far greater change which takes place this month. In describing the methods used on the Mobile & Ohio, therefore, we are in substance describing what will be used throughout the South this month.

The Mobile & Ohio was changed on July 8, 1885, the orders for the change having been issued by the General Manager June 1.

Both it and the Illinois Central were changed to the general standard of the northern roads, 4 ft. 8½ in. instead of 4 ft. 9 in., which latter has unfortunately been chosen for some reason which does not clearly appear, as the general southern standard, although its use elsewhere on the continent is confined almost exclusively to the lines of the Pennsylvania system.

The east rail being the line side upon this road, it was determined to change the west rail. Orders were issued to section-masters to prepare this side of track, the preparation consisting in adzing off any inequality in ties which would interfere with shifting of rail, the setting of spikes and changing of switch bars.

Switch Bars.—Switch-bars were furnished from plans adopted by the Master Mechanic, to permit of a centre readjustment by the amount of the change of gauge, as shown in fig. 1. A few sets of these were first made for each division and sent to the nearest section-master, and those taken out were forwarded to the shop to be changed to the new plan. This interchange of new and old was continued until new ones were substituted for the old over the entire line.

Tools.—In addition to the regular tools of section-masters, they were furnished with an extra adze and a new track gauge with which to set spikes. This consisted of a piece of iron 3½ in. broad, ½ in. thick, with a handle of ⅝ in. round iron about 3 ft. 6 in. long, for convenience of handling, as shown in fig. 2. This gauge was used for ordinary track where only the west rail was changed, but upon bridges, where it was necessary to change both rails to preserve the centre line, a gauge 1¾ in. wide, but similar in other respects, was furnished.

Ties.—During the month of June any weak points were strengthened by putting in new ties, so that no risk would be incurred by drawing the proper amount of spikes. For replacing broken and defective spikes, four kegs were furnished each section, to be used in setting to standard gauge.

All lever hand-cars were sent to the shop and narrowed up. Meantime push-cars were used,

Cattle Gaps.—Cattle gaps on this road consist of pit, head-blocks and longitudinal stringers let into the head-block 6 in., upon which rails are laid. A section 3½ in. deep was sawed out of the head-block east of the stringer, and a temporary 3½ in. plank inserted and nailed sufficiently to hold to place. Upon day of change all that was necessary was to loosen this plank, move the stringer 3½ in. east, change the 3½ in. block to the west side, and secure permanently.

Time Required in Preparing.—Upon sections of eight miles it required, upon an average, for adzing and setting spikes, 53 days actual labor, and for drawing additional spikes just previous to change of gauge, 20 days.

The following material was supplied on the day before change: One narrow-gauge lever car at commencing point of each section; 2 kegs spikes at each mile post; 39 lbs. baker's bread; 29 lbs. cooked meat; one water barrel, and tools as per bill of instructions.

Labor was secured by each section foreman during June in accordance with following attached special instructions issued by the General Superintendent.

"Each cross-tie will be adzed, when necessary, even with the bottom of rail for a space of 5 in. inside of west rail, and all spikes on the inside of the west rail will be drawn and set as gauge spikes, except the spike in every third tie. Gauge spikes must be driven straight and accurately to the gauges furnished for the purpose, and to such a depth as will leave 1½ in. clear space between top of the tie and under head of spike. The drawing and setting of all spikes as directed above must be completed by July 1.

"Roadmasters will see that all of their switch-rods are prepared for change in accordance with plans previously furnished, and that all switch stands on the west side of track are in such condition that they may be readily moved, previous to the day of change. They will also see that each section-master is provided with one 5 ft. gauge pole car, and one 4 ft. 8½ in. gauge lever-car, to be used on the day of change.

"On July 6 and 7, section-masters will draw every other spike from the outside of the west rail, straighten them and leave them distributed for use on July 8. They will also distribute about three new spikes to each rail.

"On the day of change every other spike must be driven on the outside of rail, and the gauge spikes previously set on the inside driven down.

"All stringer bolts must be removed from the west stringers of trestles by July 1, and immediately after change of gauge is completed these stringers will be pushed in to their proper positions.

"Each section foreman will be furnished with the following tools, and must have them in good order and ready for use at the place designated for commencing work at the time appointed: 10 claw-bars, 1 adze, a supply of extra spike-maul handles, 1 axe, 4 kegs of track spikes, 13 spike-mauls, 1 track wrench, 2 track gauges 4 ft. 8½ in., 1 barrel of water, bucket and tin cup, 6 good cold chisels; in addition to which, section masters will provide themselves with 8 serviceable wooden hand-spikes for throwing rail. They will also have on hand one day's supply of cooked provisions for their entire force, a 5-ft. gauge pole-car to be loaded with the provisions, water, spikes and extra tools, and to be pushed ahead of the working force, and a 4 ft. 8½ in. gauge lever car to follow after.

"The following organization will be adopted, but may be changed as the work progresses, if deemed advisable:

6 men with claw-bars drawing inside spikes.
1 man with spike-maul driving down stubs.
5 men throwing rail.
8 outside spikers.
3 inside spikers.
3 extra men for shoving cars, carrying water, etc.

26 men in all besides foremen.

[The gangs on each two alternate sections began together and worked away from each other till meeting the next gang.]

"At relay points and large stations having a number of side tracks, road-masters may change such side tracks as are not needed, a few days before day of change. And each section foreman will change such side tracks as are on his section immediately after changing main line.

"Construction-train forces, with 4 ft. 8½ in. engines, will be posted at the following points on morning of change.

"One train at Whistler to run north to Meridian assisting on the way.

"Two trains at Macon, one to run to Okolona and one to Meridian.

"One train at Jackson to run to Okolona.

"One train at South Columbus to run to Jackson.

"The pay of each laborer on the day of change will be $1.50 per day and rations, to be paid to all laborers, including regular force, as soon as the work is completed. Section-masters will be provided with tickets for paying their men, and these tickets will be cashed by the nearest agent.

"Section-masters can commence work any time on July 8, after 3:30 a. m., except between Whistler and Macon, and these can commence after Nos. 1 and 2 have passed, and between Whistler and Mobile, who must wait until extra taking No. 2's cars from Mobile to shops passes.

"The track between South Columbus and Cairo, will be changed on Tuesday, June 30. Branches will be changed on Thursday, July 9."

To guard against contingencies, two gravel train forces of 25 men each were divided and stationed at places where there was most side track, where labor was scarcest, and where there were more difficulties to contend with in changing gauge. This also insured a fair proportion of trained spikers to each section.

Work commenced generally about 4 a. m., and finished, on an average, about 4 p. m., or sooner, according to amount of trestle work and sidings on each section. Enough side-track was changed at each station to accommodate at least one average freight train.

Extra Train.—The bridge train had been previously narrowed up and sent around to north end of division to run south on the day of change, both to test the track and to assist in any failure to make connection by changing forces. As each section was passed successively all gravel-train hands were picked up and carried into Jackson, where their trains awaited them, narrowed up and ready to go out. The following day they were assigned to duty at stations having

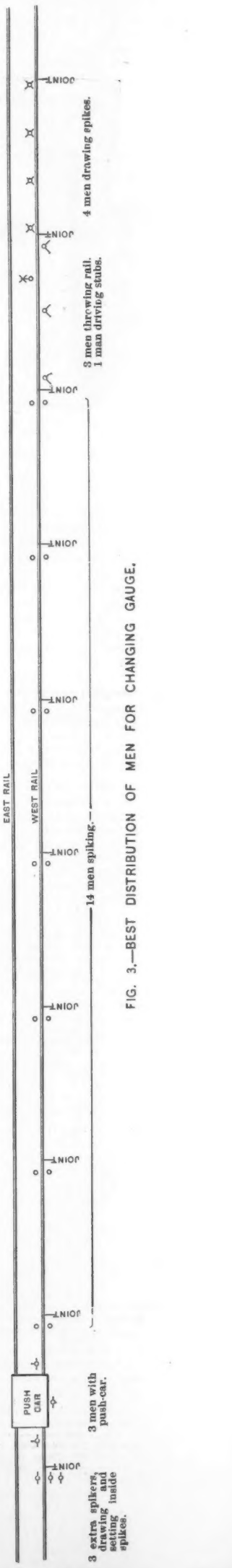


FIG. 3.—BEST DISTRIBUTION OF MEN FOR CHANGING GAUGE.

unchanged side-tracks, to complete it as rapidly as possible. The main line was finished by the regular section forces.

Finishing Main Line.—It required about 50 days' labor per section of eight miles to put the track in shape after changing gauge, depending of course upon how well the work had been done upon that day. The figures given are for labor only, and do not include superintendence. All these figures are based upon eight-mile sections. It was concluded that they should not exceed this length and that the length of all trestles and bridges, when both sides are changed, should be deducted from this amount. If this is adopted and the labor judiciously distributed, every section should finish within same hour, with perfectly safe track. Success depends, to a great extent, upon plenty of expert spikers.

Experience indicated that the following would have been a more effective organization of labor:

4 men with bars drawing inside spikes.
1 man with spike-maul driving spikes.
3 men throwing rail, with claw bars.
6 inside spikers } working in pairs.
6 outside spikers }
2 extra spikers pulling outside and defective inside spikes.
1 man with claw-bar holding up low ties for extra spikers.
3 men carrying water, spikes and pushing car.

The push car should be narrowed up and only used on day of change. This puts it behind out of the way and close up to the spikers, who will certainly require water and spikes. The relative positions of a working force thus disposed are shown in fig. 3. A force worked under the personal observation of one of the roadmasters narrowed up five miles in 5½ hours.*

The practice was to draw two spikes and leave one, setting one of these drawn next to one left in track. This leaves one in, one out and the third set for standard gauge. If the section force consists of six men, this work should begin 10 days before change of gauge. The closer this work is done the day of change of gauge, the less loss in spikes, and consequently the less trouble and delay in distributing upon that day.

Working Limits.—Working limits should be defined before the spikes are drawn and set. In drawing and setting spikes the section force should travel in the same direction they would on day of change. If spikes are not set perfectly straight they will lean *from* setter. A spiker traveling in the opposite direction would have to face about to drive one in this position, thereby losing time.

In Fig. 3, showing the disposition of working force, each pair of main spikers should drive the inside spikes previously set, and an outside spike opposite. The extra spikers behind the push-car will remedy any defective spiking. Behind everything the man in charge should come and inspect every rail. As it was put by one of the roadmasters, "There are only two ways of finding defects: One is by looking for them; the other is by a wreck. The former is preferable, should be adopted, and will prove a preventive of the latter."

The first set of main spikers act as leaders, and the remaining pairs fall in their regular order as assigned to them. To avoid confusion, when six rails have been spiked the leaders count off six rails ahead and resume spiking, the others falling in regular order behind. The best spikers were not put as leaders. This would result in breaking down the inferiors. A medium pair was taken for this place, and undue haste avoided.

[*In narrow-gauging the New York, Pennsylvania & Ohio Railroad, June 21-2, 1880, two gangs of 22 men each, throwing in *both rails*, completed 5 miles, on an average, in four hours, the quickest work having been 2 hours 25 minutes, between 4 a. m. and 6:25 a. m.—ED.]

Cummings' Semaphore Switch Stand.

The rotating targets usually employed to indicate the position of switches by differences of form or color, are sometimes liable to be misinterpreted, when seen at a distance, from an approaching train, because of curvature of track, or other circumstances making it difficult to discern the form or color.

The semaphore arm, depending on its position, and not on form, has been generally accepted as the best railroad signal, and the use of the semaphore as a switch signal would seem to be desirable, especially for switches in main line tracks where trains move at full speed. The Pennsylvania Steel Company has commenced the manufacture of an improved Semaphore Switch Stand, shown in the accompanying drawings.

This switch has the great advantage of standing some distance above the track, and therefore in most situations showing against the sky line, a very important qualification in many states of the atmosphere. Even when owing to the proximity of hills and high buildings, this advantage is not obtained, the semaphore arm or light will be visible round curves over the tops of engines or cars that may be standing on a siding clear of the main line, but in the line of vision of the engineer of an approaching train. This switch stand appears to achieve, at a small cost, some of the objects of a regular signal box where all the switches are worked from one cabin, are interlocked, and are elevated on lofty posts, so as to be clearly visible from a considerable distance. In situations where the cost of such an arrangement is prohibitive, the protection of switches by the signal illustrated will be a decided improvement on the inefficient and barely visible switch signals too generally used.

In fig. 1 the switch is held for the main line track, the handle of the stand being folded down into a notch in the top of the frame, and over a hasp, where it may be secured by the usual padlock employed for locking switches. In this position the semaphore hangs nearly vertical, and, by night, the light shows clear. As shown in fig. 2, simply raising the handle out of the notch in the frame, in order to move it around, brings the semaphore fully up to the horizontal position, or "danger" position, bringing the red glass over the lamp opening on both sides for night signals. After moving the handle away from over the notch, as in changing the switch, the handle cannot be folded, or the position of the semaphore changed until the switch has been set for the siding track, when the handle may be folded down into the notch, which places the semaphore in an intermediate position, (as shown in fig. 3), bringing the green glass over the lamp openings. It will be noticed that unlocking and raising the handle, expressing intention to move the switch, gives a danger signal which cannot be varied until the switch has been again secured against accidental displacement.

CUMMINGS' SEMAPHORE SWITCH STAND.

Made by the PENNSYLVANIA STEEL CO., *Steelton, Pa.*

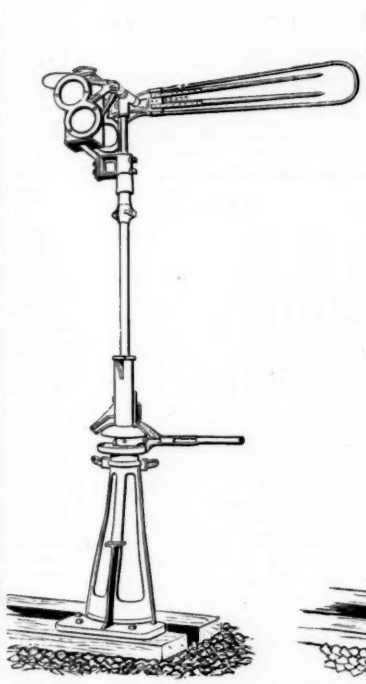


Fig. 2.

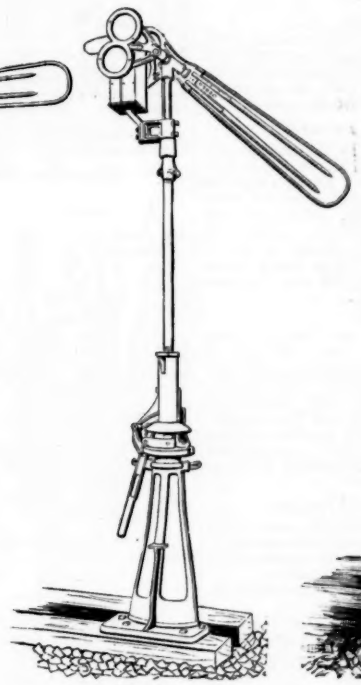


Fig. 3.

Fig. 1.

The construction is very simple and substantial. The semaphore and lamp are supported by a vertical shaft which is secured to the top of the frame. The semaphore receives movement from a rod which attaches to the upper end of a tube arranged to slide up and down on the vertical shaft, the lower end of the tube having a peculiarly shaped head, provided with a flange and grooves with which the end of the handle engages. The semaphore may extend to the right or left hand, as desired, the change being easily made. The lamp used may be of such pattern as the railroad uses for switches, preferably it should have only two openings, for lenses, instead of four as used on rotating switch stands. The stand is provided with step and projections on which to climb and stand to put on or take off the lamp.

This semaphore switch stand is the invention of A. G. Cummings, and is manufactured by the Pennsylvania Steel Company, at Steelton, Pa., from whom any further particulars may be obtained.

TECHNICAL.

Locomotive Building.

The Baldwin Locomotive Works in Philadelphia have completed two locomotives for the Suburban Rapid Transit line in New York, and are building 10 more. These locomotives are of the Forney pattern, have 14 by 18 in. cylinders and 4 ft. drivers, and weigh 55,000 lbs. each.

The Car Shops.

The New York, Lake Erie & Western Co. has recently let contracts for 25 new passenger cars. Of these Brill & Co., in Philadelphia, will build 5; the Gilbert Car Works, in Troy, N. Y., 8, and Bowers, Dure & Co., in Wilmington, Del., 12. All these cars will have steel-tired wheels, 12 of them the Paige wheel, 8 the Snow wheel and 5 the Dickson wheel.

The New York, Lake Erie & Western is building 5 new milk cars at the Jersey City shops on a new pattern. These cars will be supplied with ice boxes and will be, in fact, refrigerator cars, but will have the same running gear as passenger cars.

The Ensign Manufacturing Co., in Huntington, W. Va., is at present turning out 9 box cars a day, and has orders on hand for 1,700 cars. The company intends to build a rolling mill in connection with its works.

In addition to the orders already noted the Buffalo Car Manufacturing Co. in Buffalo, N. Y., has an order for 400 hopper bottom gondola coal cars for the New York, Lake Erie & Western.

The Youngstown Car Works in Youngstown, O., have an order for 400 coal cars for the New York, Pennsylvania & Ohio road.

The Jackson & Sharp Co. in Wilmington, Del., has just delivered 2 handsomely-finished, first-class passenger cars to the Cape Fear & Yadkin Valley road.

The Gilbert Car Works in Troy, N. Y., are building 16 passenger cars for the Suburban Rapid Transit line in New York. They are similar to those in use on the Manhattan Elevated lines.

Bridge Notes.

The firm of Jones & Benner, of Philadelphia, contractors and bridge builders, was dissolved on April 20. The business of the late firm will be settled by either of the parties, Messrs. Jonathan R. Jones and Samuel T. Benner, at their office in Philadelphia. The business of the firm has been transferred to a new corporation, to be known as the Jones & Benner Co., which will continue to contract for the furnishing and erection of iron and wooden bridges and buildings, and will have its office at 218 South Fourth street in Philadelphia.

Mr. A. M. Brown, President of the Pittsburgh Bridge Co., has been chosen Vice-President of the Keystone Bridge Co., of Pittsburgh.

The Pittsburgh Bridge Co. in Pittsburgh recently received a contract for 3 highway bridges in western Pennsylvania.

Iron and Steel.

Rebecca Furnace at Kittanning, Pa., has gone out of blast.

The old Allen Furnace at Sharpsville, Pa., has been leased to Oliver Brothers & Phillips, of Pittsburgh, and will soon go into blast.

Oley Furnace in Berks County, Pa., has gone into blast. It is a charcoal furnace.

The Beaver Falls Steel Works in Beaver Falls, Pa., which have been idle for over two years, have started up.

The rolling mill at Moundsville, W. Va., was recently sold at public sale and bought by Joseph D. Weeks, of Pittsburgh.

Eagle Furnace at Roland, Pa., will shortly go into blast. It is a charcoal furnace.

The Irondale Furnace at Irondale, W. Va., has been torn down and work has begun on the erection of a new furnace, much larger than the old one.

The new Clapp-Griffiths steel plant at the McCormick Iron Works in Harrisburg, Pa., has been started up. It is making ingots for boiler plate and nails.

Lime Rock Furnace at Lime Rock, Conn., went into blast May 1. This makes 5 charcoal furnaces of the 9 in Western Connecticut now in blast.

Manufacturing and Business.

The Damascus Bronze Co., of Pittsburgh, is building a new foundry 50 by 120 ft. in Allegheny, Pa., in order to meet the growing demand for Damascus bronze. The foundry will be ready for occupation about July 1, and the company's office will be in the Lewis Block. In the new foundry natural gas will be used, and this will be the first establishment in Pittsburgh, or in the United States, to use this fuel in journal bearing metal.

The Keystone Steam Pump Works in Pittsburgh, last week shipped a duplex pressure pump, weighing 6 tons, to the Volta Iron Co. They are now building 3 heavy pumps of this pattern for Park Brothers & Co., and 2 others for one of the new steel plants in Pittsburgh.

The Yale & Towne Manufacturing Co., of Stamford, Conn., has just shipped two 5-ton capacity locomotive cranes to Carnegie Bros. & Co., Limited, for the Union Iron Mills in Pittsburgh. These cranes are of 7 ft. gauge, have steel-tired wheels and steel gears.

The Marion Steam Shovel Co. at Marion, O., has several

orders in hand and is running its works to their full capacity. The company reports the outlook for the season's business good, although the strikes have had the effect of causing some postponement of orders from parties who think it better to wait until business becomes more settled.

The Rail Market.

Steel Rails.—The market continues quiet and firm, with quotations at $34.50@$35 per ton at Eastern mills for ordinary sections. There is an increased demand reported for light rails, which are quoted at $36@$42 per ton, according to weight.

Rail Fastenings.—The market is quiet and steady, with quotations at 2.40 cents per lb. for spikes in Pittsburgh; 2.70 @3 cents for track-bolts, and $1.75@$1.85 cents for splice-bars.

Old Rails.—More inquiry is reported for old iron rails, but the market is still dull, and quotations vary from $19@$21 per ton at tidewater. Old steel rails are scarce, and are quoted at $21@$22 per ton in Pittsburgh.

The Pintsch Light.

The Pintsch Lighting Co., of New York, has received from the firm of William Cramp & Sons an order to equip the new ferryboat "John King," now being built by that firm for the New York, Lake Erie & Western road, with the necessary gas appliances for lighting boats on the Pintsch system.

Railroad Extensions in Australia.

Railway intercommunication between the Australian colonies is rapidly extending. It is expected that the South Australian portion of the Intercolonial Railway will be completed about the end of April. Two new engines for the line have arrived from Messrs. Dubs & Co., Glasgow. They are very powerful engines, specially suited for hill traffic. The four sleeping cars were, at date of recent mail, expected to arrive shortly from America. They are described as large, handsome carriages, with every accommodation for travelers overland to and from Victoria.—*Engineer.*

Glass Hand-Wheels.

Glass hand-wheels for steam fittings have been recently brought into the market. These are solid disks of black or colored molded glass which has been toughened, and are formed with a square hole for the spindle, on which they are fastened by a nut. Compared with metal hand-wheels they recommend themselves by their cheapness and less conductivity of heat, so that they can be always handled without fear of burns. They are stated to be more durable and cleanly than wood wheels, but it seems doubtful whether they would stand such rough usage.

Blast Furnaces of the United States.

The *American Manufacturer* says: "On the next page will be found a table giving, in detail by districts and fuels, the number of blast furnaces in this country in and out of blast on May 1, and the weekly capacity of the same.

"In a condensed form the table makes the following showing:

	In blast.		Out of blast.	
Fuel.	No.	Weekly capacity.	No.	Weekly capacity.
Charcoal	47	8,462	174	16,246
Anthracite	122	33,767	99	21,747
Bituminous	128	68,106	94	32,276
Total	297	110,335	367	70,269

"A comparison of this table with that giving the condition of the furnaces last month shows that there has been an increase in the number in blast and the weekly capacity of all three classes. Three more charcoal furnaces are in blast and there is an increase in total capacity of charcoal furnaces in blast of 1,696 tons. The anthracite furnaces in blast have increased 5 in number, but only 487 tons in weekly capacity, while the bituminous furnaces in blast have increased, on a corrected statement for April, 11 in number and 1,350 tons in capacity.

"Since Jan. 1 the increase in furnaces in blast and weekly capacity has been most marked. The statement for the two dates is as follows, using corrected figures:

	—Jan. 1, 1886.—		—May 1, 1886.—	
Fuel.	No.	Weekly capacity.	No.	Weekly capacity.
Charcoal	57	7,804	47	8,462
Anthracite	104	29,811	122	33,767
Bituminous	112	59,436	128	68,106
Total	273	97,051	297	110,335

"The number of charcoal furnaces in blast is less May 1 than Jan. 1 by 10, but the weekly capacity is about 620 tons greater. The average capacity per furnace of the anthracite furnaces in blast May 1 is less than the average capacity of those in blast Jan. 1, it being 276¾ tons in May and 286⅛ tons in January. On the other hand, the average capacity of the bituminous furnaces in blast May 1 is slightly in excess of the average capacity Jan. 1, being 530 tons Jan. 1 and 532 tons May 1.

"So far as statistics have been preserved, there never was a time in the history of the country when so large a furnace capacity was in blast. There have been months, in those years for which statistics have been preserved, when the charcoal furnaces in blast showed a larger capacity, and months in other years when the anthracite furnaces in blast had a greater capacity, but this month's return shows the largest bituminous capacity in blast ever reported, and the total of the three capacities is greater than the total of any other date for which we have figures. The effect of this condition of affairs must be and is felt in the market. Compared with the production, the demand for pig iron is light, and prices are by no means firm. With fully $1 per ton added to the cost of pig iron in the last month prices are not advanced, and if anything are weaker than a month or six weeks ago. The stocks of iron are increasing also, with a possible diminished demand. It occurs to us that this is a good time to consider."

New Towers for the Niagara Bridge.

Work on the new towers of the Niagara Suspension bridge has been commenced. Engineer Buck, who has charge of the matter, and who replaced the wooden part of the bridge with iron without delaying a single train, will now replace the stone towers over which the cables are stretched and which really sustain the whole weight of the bridge, with steel towers. It is stated that when the steel structures are ready to be put into position it will take about 60 days to finish the work. The first operation, which is now in progress, consists in removing the offices and stairways at the ends of the bridge.

Lake Superior Iron Ore.

The Cleveland *Iron Trade Review* says: "The total amount of iron ore on dock at lake ports this spring was 43.7 per cent. less than one year ago. This has doubtless been owing to, first, the increased consumptive demand of the furnaces, and secondly, to the rush during April to hurry forward ore before the new iron ore pool rates went into effect on the railroads.

"Subtracting the amount on dock at the opening of navigation this year from that at the close of navigation last fall, it appears that 735,619 tons went into consumption during the winter.

"The total amount of ore on dock at Lake Erie ports at the

RAILROAD EARNINGS IN MARCH.

Name of Road.	Mileage. 1886.	1885.	Inc.	Dec.	P. c.	Earnings. 1886.	1885.	Inc.	Dec.	P. c.	Earnings per Mile. 1886.	1885	Inc.	Dec.	P. c.
EASTERN ROADS.															
Balt. & Potomac		92				$ 106,507	$ 122,839		$ 16,332	13.3	$ 1,158	$ 1,335		$ 177	13.3
B., H. T. & W.	87	87				47,623	41,137	6,486		15.8	547	473	74		15.8
Buff., N.Y. & Ph.	663	663				204,743	188,969	15,774		8.4	309	285	24		8.4
Buff., Ro. & Pitts	294	294				97,998	95,543	1,955		2.1	332	325	7		2.1
Danbury & Nor.	37	37				16,966	16,443	523		3.2	458	444	14		3.2
Grand Trunk	2,998	2,977	21		0.7	1,226,362	1,087,700	138,662		12.7	409	965	44		12.0
Long Island	354	354				193,824	177,219	16,605		9.4	548	501	47		9.4
N. Y. City & No.	54	54				44,369	33,100	11,269		34.1	822	624	198		34.1
N. Y., L. E. & W.	1,075	1,075				1,464,950	1,269,249	195,701		15.4	1,363	1,181	182		15.4
N. Y. & N. Eng.	392	392				320,831	263,934	56,897		21.5	818	673	145		21.5
N. Y., Ont. & W.	321	373		52	14.0	97,381	148,503		51,122	34.2	303	398		95	23.8
N. Y., Sus. & W.	150	150				89,179	91,098		1,919	2.1	594	607		13	2.1
Northern Cen.	322	322				460,147	483,360		23,213	4.8	1,429	1,501		72	4.8
Penn. Railroad	2,315	2,268	47		2.1	3,901,855	3,635,374	266,481		7.3	1,685	1,603	82		5.1
Phila. & Reading	1,560	1,560				2,296,118	1,919,502	376,616		19.6	1,472	1,231	241		19.6
Rome, Wat. & Og	418	418				152,827	123,287	29,540		24.0	366	295	71		24.0
West Jersey	200	200				91,046	82,404	8,642		10.5	455	412	43		10.5
Total, 17 roads	11,332	11,316	68	52		10,812,226	9,779,661	1,125,151	92,586		955	864	91		
Total inc. or dec.			16		0.1			1,032,565		10.5			91		10.5
SOUTHERN ROADS.															
Ala. Great So.	290	290				98,839	97,203	1,636		1.7	341	335	6		1.7
Chesapeake & O.	502	502				378,154	268,774	69,380		25.8	674	535	139		25.8
Ches., O. & S. W.	399	399				139,004	128,528	10,476		8.1	348	322	26		8.1
Cin., N. O. & T. P.	336	336				234,021	208,957	25,064		12.0	697	622	75		12.0
East T., V. & Ga	1,100	1,100				344,023	324,401	19,622		6.1	313	295	18		6.1
E., Lex. & B. S.	130	130				74,283	53,306	20,977		39.3	571	410	161		39.3
Ill. Cen., So. Div.	711	711				313,039	419,431		106,392	25.8	440	590		150	25.8
L., N. O. & Tex.	533	455	78		17.1	128,041	109,874	18,167		16.5	240	241		1	0.4
Louis. & Nash.	2,015	2,065		50	2.4	1,100,905	1,281,516		180,611	14.1	546	621		75	12.1
Mem. & Char.	292	292				115,171	109,252	5,919		5.4	394	374	20		5.4
Mobile & Ohio.	527	527				144,687	190,956		46,269	24.2	275	362		87	24.2
N., Chat. & St. L.	580	580				187,349	186,737	612		0.3	323	322	1		0.3
N. O. & North'n.	195	195				56,030	69,449		13,419	19.3	287	356		69	19.3
Norfolk & West.	512	512				277,307	220,416	56,891		26.8	542	430	112		26.8
Rich. & Danville	757	757				392,600	360,562	32,038		8.9	519	476	43		8.9
Ch., Col. & A.	377	377				84,019	75,578	8,441		11.1	223	200	23		11.1
Col. & Green'e.	296	296				78,540	69,062	9,498		13.8	265	233	32		13.8
Ga. Pacific.	317	310	7		2.3	64,195	57,024	7,171		12.6	203	184	19		10.3
Va. Midland.	352	352				113,981	113,698	283		0.3	324	323	1		0.3
West. N. Caro.	286	274	12		4.4	45,606	38,586	7,020		18.1	160	141	19		13.6
Vicks. & Merid'n	142	142				40,891	36,390	4,501		12.4	287	256	31		12.4
Total, 21 roads	10,649	10,602	97	50		4,370,705	4,419,700	297,696	346,691		410	417		7	
Total inc. or dec.			47		0.4				48,995	1.1				7	1.6
CENTRAL GROUP.															
Chi. & East. Ill.	252	252				143,706	146,727		3,021	2.1	570	582		12	2.1
Chi. & W. Mich.	413	413				129,827	112,839	16,988		15.0	314	273	41		15.0
C., L., St. L. & C.	342	342				228,209	221,186	7,023		3.2	667	647	20		3.2
C., Wash. & Balt.	281	281				188,079	162,074	26,005		17.0	669	577	92		17.0
Clev., Ak. & Col.	144	144				42,731	40,108	2,623		6.5	297	279	18		6.5
Cleve. & Canton.	161	161				28,709	24,400	4,309		17.6	178	152	26		17.6
Col., H. V. & T.	328	324	4		1.2	198,596	214,330		15,734	7.4	605	662		57	8.6
Det., Lan. & No.	261	261				104,710	97,767	6,943		7.1	401	375	26		7.1
Ev. & T. Haute.	146	146				58,429	60,818		2,389	3.9	400	416		16	3.9
Flint & Pere M.	362	362				199,503	158,108	41,395		26.8	551	437	114		26.8
Ill. Cen., Ill. lines	953	953				490,961	555,369		64,408	11.6	515	583		68	11.6
Ind., Bl. & West.	532	532				203,877	227,089		23,212	10.2	383	427		44	10.2
Ind., Dec. & Sp.	152	152				30,862	25,744	5,118		19.9	203	170	33		19.9
L., Ev. & St. L.	253	253				72,832	51,000	21,832		42.8	288	203	85		42.8
N. Y., Penn. & O.	587	587				482,751	440,107	42,644		9.7	822	750	72		5.7
Ohio & Mississip.	615	615				305,759	341,591		35,832	10.5	497	555		58	10.5
Ohio Southern	130	130				38,946	15,596	23,350		149.8	300	120	180		150.0
Peor., Dec. & Ev.	254	254				56,678	59,791		3,113	5.2	223	235		12	5.2
St. L. Al. & T. H.:															
Main line	195	195				89,655	113,951		24,296	21.3	460	584		124	21.3
Belleville line.	138	138				57,979	68,058		10,079	14.8	420	493		73	14.8
Wab., St. L. & P.	2,262	2,262				1,022,815	1,041,535		18,720	1.8	452	460		8	1.8
Total, 21 roads	8,761	8,757	4			4,175,614	4,178,188	198,230	200,804		477	477			
Total inc. or d.			4						2,574	0.1					
NORTHWESTERN ROADS.															
Bur., Ced R. & No.	990	990				241,943	272,369		30,426	11.2	244	275		31	11.2
Central Iowa	500	500				111,034	127,397		16,363	12.9	222	255		33	12.9
Chi. & Alton.	850	850				611,726	680,851		69,125	10.1	720	801		81	10.1
Chi., Bur. & Q.	3,647	3,467	179		5.1	2,223,414	2,639,110		415,696	15.8	610	761		151	19.9
Chi., Mil. & St. P.	4,921	4,804	117		2.4	2,034,000	2,081,071		47,071	2.3	413	433		20	4.4
Chi. & Northw.	3,948	3,840	108		2.8	1,988,900	1,986,542	2,358		0.1	504	515		13	2.5
C., St. P., M. & O	1,340	1,320	20		1.5	517,000	458,824	58,176		12.7	386	348	38		11.0
Des M. & Ft. D.	143	143				31,651	31,504	147		0.5	221	220	1		0.5
G. B., W. & St. P.	220	220				35,405	25,352	10,053		39.7	161	115	46		39.7
Ill. Cen., Ia. lines	402	402				153,700	154,082		382	0.2	382	383		1	0.2
Mar., H. & Ont.	160	138	22		15.7	29,690	23,342	6,348		27.5	186	169	17		10.1
Mil., L. S. & W.	533	491	42		8.6	146,820	100,771	46,049		45.5	275	205	70		35.0
Mil. & Northern.	227	227				50,740	52,822	3,918		7.4	250	233	17		7.4
Wisconsin Cen.	440	440				130,999	137,938		6,939	5.0	298	313		15	5.0
Total, 14 roads.	18,320	17,832	488			8,313,022	8,771,975	127,049	586,002		454	492		38	
Total inc. or dec.			488		2.7				458,953	5.2				38	7.7
ROADS NORTHWEST OF ST. PAUL.															
Canadian Pac.	3,527	3,064	463		14.9	610,000	488,896	121,104		24.8	173	160	13		8.1
Northern Pac.	2,741	2,453	288		11.6	858,116	691,612	166,504		24.0	313	282	31		11.1
St. P. & Duluth.	225	225				76,746	62,055	14,691		23.7	341	276	65		23.7
St. P., Minn. & M	1,485	1,471	14		0.9	590,000	576,011	13,989		2.4	397	392	5		1.3
Total, 4 roads.	7,978	7,213	765			2,134,862	1,818,574	316,288			268	252	16		
Total inc. or dec.			765		10.6			316,288		17.4			16		6.4
SOUTHWESTERN ROADS.															
Fort W. & D. C.	144	110	34		30.9	23,799	32,276		8,477	26.5	165	293		128	44.2
G. C. & S. Fe.	625	536	89		16.5	140,335	93,634	46,701		49.8	225	175	50		28.7
K. C., Ft. S. & G.	389	389				220,551	229,464		8,913	3.9	567	590		23	3.9
K. C., S. & Mem.	282	282				130,845	134,683		3,838	2.9	464	478		14	2.9
St. L. & San F.	870	814	56		6.7	385,767	385,714	53			443	474		31	6.7
Tex. & St. Louis.	735	735				126,021	89,985	36,036		40.1	171	122	49		40.1
V., Shreve. & Pa.	170	170				32,888	32,415	473		1.4	193	191	2		1.1
Total, 7 roads.	3,215	3,036	179			1,060,206	998,171	83,263	21,228		330	329	1		
Total inc. or dec.			179		5.9			62,035		6.3			1		0.3
FAR WESTERN AND PACIFIC ROADS.															
A., T. & S. Fe.	2,418	2,375	43		1.8	1,309,352	1,346,135		36,783	2.7	542	567		25	4.4
Den. & Rio G.	1,317	1,317				493,584	491,463	2,121		0.4	375	373	2		0.4
Den. & Rio G. W.	368	368				83,472	69,335	14,137		20.5	227	188	39		20.5
St. J. & G. Isl'd.	252	252				112,435	118,695		6,260	5.3	446	471		25	5.3
Union Pacific.	4,519	4,499	20		0.4	1,954,208	1,975,517		21,309	1.1	432	439		7	1.6
Total, 9 roads.	8,874	8,811	63			3,953,051	4,001,145	16,258	64,352		445	454		9	
Total inc. or dec.			63		0.7				48,094	1.2				9	1.9
Grand Total: Total, 89 roads	69,129	67,567	1,664	102		34,819,686	33,967,414	2,162,935	1,311,663		504	503	1		
Total inc. or dec.			1,562		2.3			852,272		2.5			1		0.2

RAILROAD EARNINGS, THREE MONTHS TO MARCH 31.

NAME OF ROAD.	MILEAGE.					EARNINGS.					EARNINGS PER MILE.				
	1886.	1885.	Inc.	Dec	P. c.	1886.	1885.	Increase.	Decrease.	P. c.	1886	1885.	Inc.	Dec.	P. c.
EASTERN ROADS.															
Balt. & Potomac.	92	92	....	....	....	$ 301,404	$ 315,152	$	$ 13,748	4.4	$ 3,276	$ 3,426	$	$ 150	4.4
Boston & Albany	384	384	....	....	....	1,779,861	1,673,748	106,113	....	6.3	4,635	4,359	....	276	6.3
Bos., H. T. & W.	87	87	....	....	....	128,297	96,202	32,095	....	33.5	1,475	1,106	369	....	33.5
Buf., N. Y. & P.	663	663	....	....	....	546 078	492,910	53,168	....	10.8	824	744	80	....	10.8
Buf., Roch. & P.	294	294	....	....	....	302,037	257,070	44 967	....	17.5	1,028	874	154	....	17.5
Dan. & Norwalk.	37	37	....	....	....	45,608	44,092	1,516	....	3.4	1,233	1,192	41	....	3.4
Grand Trunk....	2,098	2,977	21	....	0.7	3,380,722	3,200,669	180,053	....	5.6	1.128	1.075	53	....	4.9
Long Island.	354	354	....	....	....	480,999	456,716	24.283	....	5.3	1.387	1,318	69	....	5 3
N. Y. City & N..	54	54	....	....	....	117,639	89,317	28,322	....	31.4	2,178	1.654	524	....	31.4
N. Y., L. E. & W.	1,075	1.075	....	....	....	3,996,537	3,459,463	507,074	....	14.7	3,690	3,219	471	....	14.7
N. Y. & N. Eng..	392	392	....	....	....	860.020	720.451	139.569	....	19 4	2,194	1.858	356	....	19.4
N. Y., N. H. & H.	265	265	....	....	....	1,635,964	1,525,733	110,231	....	7.2	6,173	5,757	416	....	7.2
N. Y., Ont. & W.	321	373	....	52	14.0	259,316	349,541	....	90,245	25.8	808	937	....	129	13.8
N. Y., Sus. & W.	150	150	....	....	....	245,211	230.268	14,943	....	6.5	1,635	1.535	100	....	6.5
Northern Cen..	322	322	....	....	....	1,291,231	1,276,675	14.606	....	1.1	4,010	3,965	45	....	1.1
Penn. R. R.....	2,315	2,268	47	....	2.1	10,872,857	9.988.587	884,270	....	8.9	4.697	4,404	293	....	6.7
Phila. & Read...	1,560	1,560	....	....	....	6,300,942	5,560.513	740,429	....	13.3	4.039	3,564	475	....	13.3
R., Wat. & Og ..	418	418	....	....	....	391,088	330,692	64,396	....	19.5	945	791	154	....	19.5
West Jersey.....	200	200	....	....	....	223,566	209,468	14,098	....	6.7	1,118	1,047	71	....	6.7
Total, 19 roads.	11,981	11,965	68	52	....	33,133,377	30,277,237	2.960,133	103,993	....	2,765	2,530	235	....	....
Tot. inc. or dec.	....	....	16	....	0.1	....	....	2,856,140	....	9.4	....	....	235	....	9.3
SOUTHERN ROADS.															
Ala. Gt South..	290	290	....	....	....	289,382	300,544	....	11,162	3 7	998	1,036	....	38	3.7
Ches. & Ohio ...	502	502	....	....	....	872,564	779,778	92.786	....	11.9	1,738	1,553	185	....	11.9
Ches., O. & S. W.	399	399	....	....	....	364,900	356 232	13,668	....	3 7	927	893	34	....	3.7
Cin., N. O. & T. P	336	336	....	....	....	642,036	606,685	35,351	....	5.8	1,911	1,806	105	....	5.8
E. T., Va. & Ga.	1,100	1,100	....	....	....	1,009,441	1,064.180	....	54,739	5.1	918	968	....	50	5.1
Eliz.. L. & Big S.	130	130	....	....	....	197,192	157,628	39,564	....	25 0	1,517	1,212	305	....	25.0
Ill. Cen.. S. Div.	711	711	....	....	....	1,001,845	1.239.629	....	237,784	19.2	1.409	1.743	....	334	19.2
Louis. & Nash....	2,015	2.065	....	50	2.4	3,200 192	3,535.573	....	335,381	9.5	1.588	1,712	....	124	7.2
Louis., N. O. & T.	533	455	78	....	17.1	426 998	307,787	119,211	....	38.7	801	648	153	....	23.6
Mem. & Char ...	292	292	....	....	....	336 569	351,765	....	15,196	4.3	1,154	1,205	....	51	4.3
Mobile & Ohio ..	527	527	....	....	....	459.062	557,131	....	98,069	17.8	871	1.057	....	186	17 8
Nash., C. & St. L.	580	580	....	....	....	557,519	546,642	10,877	....	2.0	961	942	19	....	2.0
N. Or. & North..	195	195	....	....	....	169 638	195.417	....	25,779	13.2	870	1,002	....	132	13 2
Nor. & West.....	512	512	....	....	....	718,002	645,952	72,050	....	11.0	1,404	1,262	140	....	11 0
Rich. & Dan.....	757	757	....	....	....	1,017,640	996,105	21,535	....	2.2	1,344	1,316	28	....	2.2
C., Col. & Aug.	377	377	....	....	....	232.439	237,165	....	4,726	2.0	617	629	....	12	2.0
Col. & Green..	296	296	....	....	....	212,291	211,716	575	....	0.3	717	715	2	....	0.3
Geo. Pacific. ..	317	310	7	....	2.3	188,799	167,022	21,777	....	13.0	596	539	57	....	10 6
Vir. Midland ..	352	352	....	....	....	305,613	317,607	....	11,994	3.8	868	902	....	34	3.8
Western N. C..	286	274	12	....	4.4	122,103	105,467	16 636	....	15.8	427	385	42	....	10.9
Vick. & Meridan.	142	142	....	....	....	131,938	114,864	17.074	....	14.8	929	809	120	....	14.8
Total, 21 roads.	10,649	10,602	97	50	....	12,461,163	12,794,889	461,104	794,830	....	1,170	1,207	....	37	....
Tot. inc. or dec.	....	....	47	....	0.4	....	....	....	333,726	2.6	....	....	....	37	3.0
CENTRAL GROUP.															
Chi. & East. Ill..	252	252	....	....	....	404,447	383,113	21,334	....	5 5	1,605	1,520	85	....	5.5
Chi. & West M..	413	413	....	....	....	309 428	253,264	56,164	....	22.2	749	613	136	....	22.2
C., I., St. L. & Ch	342	342	....	....	....	623,371	597.173	26,198	....	4.4	1,823	1,746	77	....	4.4
C., Wash. & Balt.	281	281	....	....	....	477.274	467,260	9.964	....	2.1	1,698	1,663	35	....	2.1
Cleve., Ak. & Col	144	144	....	....	....	109,655	105,294	4,361	....	4.2	762	731	31	....	4.2
Clev. & Canton .	161	161	....	....	....	71,109	66,673	4,496	....	6.7	442	414	28	....	6.7
Col., H. V. & Tol	328	324	4	....	12	525.921	539.587	....	13,666	2.5	1,603	1,665	....	62	3 7
Det., Lans. & No	261	261	....	....	....	239.937	237,416	22,521	....	9.5	996	910	86	....	9 5
Ev. & Terre H ..	146	146	....	....	....	165 448	158.459	6 989	....	4 4	1,133	1,085	48	....	4.4
Flint & Pere Mar	362	362	....	....	....	508,544	431,530	77,014	....	17 8	1,405	1 192	213	....	17 8
Ill. Cent., Ill lines	953	953	....	....	....	1,424,156	1,519,844	....	95,688	6.3	1,494	1,595	....	101	6.3
Ind., Bloom. & W	532	532	....	....	....	578,895	563.151	15,744	....	2.8	1,088	1,059	29	....	2,8
Ind., D. & Spring	152	152	....	....	....	98,859	85,632	13,227	....	15.4	650	563	87	....	15.4
Louis., E. & St. L	253	253	....	....	....	187.047	154,301	32.746	....	21.3	739	610	129	....	21.3
N. Y., Penn. & O	587	587	....	....	....	1.337.902	1,170.774	167,128	....	14.3	2.279	1,995	284	....	14.3
Ohio & Miss. ...	615	615	....	....	....	854,368	909.770	....	55,402	6.1	1,389	1,479	....	90	6.1
Ohio Southern..	130	130	....	....	....	127,715	104.246	23,469	....	22.5	982	802	180	....	22 5
Peoria, Dec. & Ev	254	254	....	....	....	173,444	176,598	....	3,154	1.8	683	696	....	13	1.8
St. L., Al. & T. H:															
Main line.... .	195	195	....	....	....	268.604	311.008	....	42.404	13.6	1,377	1.595	....	218	13 6
Belleville line..	138	138	....	....	....	178.008	199 358	....	21.350	10.7	1,290	1,445	....	155	10.7
Wab., St. L. & P.	2,337	2,337	....	....	....	2.891,645	2,994.099	....	102,454	3.4	1,237	1,279	....	42	3.4
Total, 21 roads	8,836	8,832	4	....	....	11,575,787	11,428,550	481,355	334,118	....	1,310	1,294	16	....	....
Total in. or dec	....	....	4	....	....	....	....	147,237	....	1.3	....	....	16	....	1.3
NORTHWESTERN ROADS.															
Bur., C. Rap & N.	990	990	....	....	....	627.054	698.625	....	71,571	10.2	633	706	....	73	10.2
Central Iowa....	500	500	....	....	....	292,937	299.636	....	6 729	2.2	586	599	....	13	2 2
Chi. & Alton ...	850	850	....	....	....	1,710,962	1.865 008	....	154.046	8.3	2,013	2,194	....	181	8.3
Chi., Bur. & Qui.	3 646	3,467	179	....	5.1	5.440,410	6,233.510	....	793,100	12.7	1.492	1,798	....	306	17.0
Chi. Mil. & St. P.	4,921	4,804	117	....	2 4	5.043,000	4.943,964	99,036	....	2.0	1,025	1.029	....	4	0.4
Chi. & No. West.	3,939	3,827	112	....	2 9	4.995,500	4,979.020	16,480	....	0.3	1,268	1,301	....	33	2.6
Ch., St. P., M. & O	1,340	1.320	20	....	1.5	1,252,866	1,097,319	155,347	....	14.2	935	831	104	....	12.6
Des M. & Ft. Do.	143	143	....	....	....	82,002	84,439	....	2,437	2.9	573	590	....	17	2.9
Ill. Cen., Ia. lines	402	402	....	....	....	360.152	359,827	325	....	0.1	896	895	1	....	0.1
Marq., H. & O..	160	138	22	....	15.7	77.608	61.661	15,947	....	26.1	485	447	38	....	8.5
Mil., Lake S. & W	533	491	42	....	8.6	339,588	247,159	92,429	....	37.4	637	503	134	....	26.8
Mil. & Northern.	227	227	....	....	....	142,266	131,934	10,332	....	7.8	627	581	46	....	7.8
Wis. Central. ...	440	440	....	....	....	312,286	333,228	....	20,942	6.3	710	757	....	47	6.3
Total, 13 roads	18.091	17,599	492	....	....	20,676,401	21,335,330	389,896	1,048,825	....	1,143	1,215	....	69	....
Total in. or dec	....	....	492	....	2.8	....	....	....	658,929	3.1	....	....	....	69	5.8
ROADS NORTHWEST OF ST. PAUL.															
Canadian Pacific	3,527	2.974	553	....	18.4	1,595,815	1,313,237	282.578	....	21.5	452	442	10	....	2 3
Northern Pacific	2,741	2.453	288	....	11.6	1,932,686	1,815.158	117,52-	....	6.5	705	740	....	35	4.7
St. P. & Duluth.	225	225	....	....	....	213.461	200.245	13.216	....	6.6	949	890	59	....	6 6
St. P., Min. & Man	1,485	1,471	14	....	0.9	1,424.176	1,433,353	....	9,177	0.6	959	974	....	15	1.5
Total, 4 roads..	7,978	7,123	855	....	....	5,166,138	4,761,993	413,322	9,177	....	648	669	....	21	....
Total in. or dec	....	....	855	....	12.0	....	....	404,145	....	8.5	....	....	....	21	3.1
SOUTHWESTERN ROADS.															
Ft. Worth & Den.	144	110	34	....	30.9	74,215	79,514	....	5,299	6.6	515	723	....	208	29.0
Gulf, Col. & S. F.	614	536	78	....	14.5	434,063	271,639	162,424	....	59 7	707	507	200	....	38.5
K. C., Ft. S. & G.	389	389	....	....	....	379,815	661 558	....	81,743	12 3	1,491	1,701	....	211	12 3
Kan. C., Spr. & M.	282	282	....	....	....	317,180	457.595	....	140,415	30.7	1,125	1,623	....	498	30.7
St. L. & San Fran	833	807	26	....	3.2	970,979	1,004,310	....	33,331	3.3	1,166	1.244	....	78	6 4
Texas & St. L....	735	735	....	....	....	326,447	238,500	97,947	....	41.0	458	395	133	....	41.0
Vicks., Sh. & Pac.	170	170	....	....	....	118,831	89,474	29.357	....	32.6	699	526	173	....	32.6
Total, 7 roads.	3,167	3,029	138	....	....	2,831,530	2,802,590	289.728	260,788	....	894	925	....	31	....
Tot. inc. or dec.	....	....	138	....	4 5	....	....	28,940	....	1.0	....	....	....	31	3.4
FAR WESTERN AND PACIFIC ROADS.															
At., Top. & S. F.	2,413	2,375	38	....	1.6	3.228.962	3.526,580	....	297,618	8.2	1,338	1,485	....	147	9.9
Denver & R. G.	1,317	1,317	....	....	....	1,326,234	1,292,112	34,122	....	2.6	1,007	981	26	....	2.6
Denv. & R. G. W.	368	368	....	....	....	211.136	198,991	12,145	....	6.1	574	541	33	....	6.1
St. Jo. & Gr. Isl'd	252	252	....	....	....	278,810	289.693	....	10,883	3.8	1.107	1,150	....	43	3.8
Union Pacific ...	4,519	4,492	27	....	0.6	5,017.378	5,214,416	....	197.038	3.8	1,110	1,161	....	51	4.4
Total, 5 roads.	8.869	8.804	65	....	....	10,062,520	10,521,792	46,267	505,539	....	1,135	1,195	....	60	....
Tot. inc. or dec.	....	....	65	....	0.7	....	....	....	459,272	4 4	....	....	....	60	5.0
GRAND TOTAL:															
Total, 90 roads..	69,571	67,954	1,719	102	....	95,906,916	93,922,381	5,041,805	3,057,270	....	1,379	1,382	....	3	....
Total inc. or dec.	....	....	1,617	....	2.4	....	....	1,984,535	....	2.1	....	....	....	3	0 2

opening of navigation for the past four year has been as follows:

Year.	Tons.	Year.	Tons.
1883	524,749	1885	556,657
1884	388,739	1886	313.321

"With docks so well cleared up, and with over 2,000,000 tons sold of the 3,000,000 tons of probable output of 1886, the shipping business this year bids fair to be very lively."

Mitis Iron Castings.

It has been known for some time that many of the best known brands of iron possess a slight accidental admixture of aluminum. The Mitis process recently introduced into this country, consists mainly in the addition of a small percentage of aluminum to molten iron in order to improve the quality of the castings. The following notes on the process contained in the *Engineering and Mining Journal* will be interesting to many of our readers:

In the paper read before the American Institute of Mining Engineers at Pittsburgh, in February last, Mr. Ostberg said that the manufacture of wrought-iron or Mitis castings depends upon several very important matters beside the necessary skill of the workman.

1st. It is necessary to have a suitable metal as raw material.

2d. An efficient and suitable furnace for smelting, so as not to injure the metal.

3d. Facilities for handling the metal from the time is is ready in the furnace until it is poured into the mold.

4th. A suitable molding material.

And in each of these Mr. Ostberg claimed, for himself and associates, to have made great improvements essential to the successful manufacture of castings from wrought-iron or low grade steel.

Mr. Ostberg's paper did not refer much to the first essential; but from a pamphlet that gives reports on Mitis iron castings, by Mr. E. A. Cowper and Mr. C. E. Cowper, and a paper by Mr. T. Nordenfelt, we take some of the following notes:

1st. *A Suitable Metal.*—Iron that is good in wrought-iron is good in Mitis castings, and that which makes poor bar iron makes poor Mitis castings; 0.20 of phosphorus is the limit allowable; but the purer the metal used the better.

It is not claimed that this process alters or improves the iron beyond making it denser and eliminating slag, thus giving wrought Mitis castings a somewhat greater strength than the wrought-iron from which they are made.

The Mitis process consists in melting wrought-iron in ordinary graphite crucibles, and adding to the molten metal a small amount (about .05 to .01 per cent.) of aluminium in the form of an alloy of aluminium and iron, which reduces the melting-point of the fused metal several hundred degrees, and thus makes it more fluid and gives time for handling it before it will solidify.

2d. *The Nobel Liquid Fuel Furnace.*—The furnace used by the Mitis casting patentees is a liquid fuel furnace, patented (Patent No. 321,840) by Ludwig Nobel, of nitroglycerine and petroleum fame. The claims of the patentee are:

"1. A liquid fuel furnace having a fire-box provided with an aperture in the front, containing horizontal trough-like fire-bars arranged one immediately over the other, and adapted to receive and maintain the liquid fuel at uniform depths.

"2. A liquid fuel furnace having a fire-box provided with an aperture in the front, containing horizontal trough-like fire-bars arranged one immediately over the other, a supply-pipe for the liquid fuel, and overflow-communications between the superposed troughs.

"3. A liquid fuel furnace having a fire-box provided with horizontal trough-like fire-bars, one over the other, to receive the liquid, air-inlet, a mixing-chamber and narrow passages leading from the mixing-chamber to the body of the furnace.

"4. A fire-bar for a liquid fuel furnace, said fire-bar consisting of a horizontal trough provided with a pan communicating perforation and overflow."

3d. It is not necessary to give any special instruction as to the means of handling quickly and conveniently the metal from the furnace to the mold. They are such as are desirable in any foundry.

4th. *A Suitable Molding Material.*—The Swedish introducers of the Mitis process have also patented (Patent No. 317,062, 1885) a molding or facing material, which is described in the patent as follows:

"One volume pure pulverized sugar is dissolved in about two volumes pure water and strained, and then one-eighth volume of kerosene or like hydro-carbon oil is added. Twenty-four to 30 volumes powdered hard-burned fire-clay are moistened with the foregoing solution, and the mass is passed through a coarse sieve several times, so as to be rendered equally moist throughout. As this facing-sand ought to be as moist as common facing-sand, more water should be added, if necessary. Instead of sugar, other binding substances can be used, such as molasses, gum, glue, etc.; but I prefer sugar, because it is clean and of even quality, and may be had everywhere."

The molds are made as in ordinary sand molding. The flasks are preferably of metal.

The advantages of this molding material are said to be that, first, it is practically infusible, and does not, therefore, stick to the castings; second, it does not carborate the castings; neither will it make them porous or brittle, as the silicon facing sand seems to do; the castings will preserve the nature of wrought-iron or steel completely, according to their percentage of carbon, etc.; third, it gives to the castings an exceedingly beautiful light-blue glossy surface; and fourth, it is cheap and easy to obtain at most iron-works where fire-bricks are used.

A furnace lining made from ground fire-brick and molasses, some years ago by Mr. Armitage Rhodes, at Montreal, closely resembles this molding material in its composition.

Metal molds or chills answer perfectly for Mitis castings, since the metal does not chill or harden, and, as it solidifies very rapidly, the molds can be opened almost immediately, and can thus be used over and over again with great rapidity.

The aluminum alloys of iron used in this process are made by the Cowles Electric Smelting Co., at Cleveland, Ohio.

Direct Process of Making Steel.

Experiments have been recently made in Pittsburgh with a new process for making steel direct from ore. The ore is broken into small pieces and mixed with 20 per cent. of Rhode Island graphite. This mixture of ore and graphite is then placed in an ordinary heating furnace, and reduced to a spongy mass at a low temperature, and it is claimed that the phosphorus and other impurities flow off with the slag. In two hours the mass is ready to be drawn. The heater has nothing to do but wait until the mass comes to nature. Then it is balled up and drawn. In this condition it is a spongy, porous mass, and is ready for the squeezers or shingling hammer. Nothing else is needed, and the best quality of steel is the result. Specimens of the sponge work have been shown hammered out into a fine knife blade. It is claimed that if this spongy mass is put through the shingling hammer into blooms, which now bring $40 per ton, these blooms can be produced at the cost of pig-iron.

RAILROAD GAZETTE

Published Every Friday.

EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

THE LAKE SHORE REPORT.

The Lake Shore report for 1885 shows figures for earnings and expenses closely agreeing with the estimates published just at the close of the year. The profit per share over interest and rentals amounted to $1.98, but after deducting the sinking fund of $250,000 it was only $1.47.

The passenger traffic last year suffered a very large decrease, in spite of the extremely low fares. It has been, in *millions* of passenger miles, for eight years:

1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.
133.7	141.2	176.1	208.0	227.1	215.7	190.5	176.8

Thus the travel last year was 7 per cent. less than in 1884, 18 per cent. less than in 1883 and 23 per cent. less than in 1882, the average fare per mile having been, in cents:

1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.
2.287	2.223	2.135	1.988	2.157	2.196	2.170	2.058

The freight traffic was much larger than the year before, but less than in any other year since 1878, having been, in *millions* of ton-miles:

1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.
1,340.5	1,733.4	1,851.2	2,021.8	1,892.9	1,689.5	1,410.5	1,602.68

The gain last year over 1884 was 13.7 per cent., but there was a decrease of 5 per cent. from 1883, 15.3 per cent. from 1882, and 20¼ per cent. from 1881, when it was largest.

The average freight rate fell far below that of any previous year, having been, in cents per ton per mile:

1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.
0.864	0.734	0.642	0.750	0.617	0.628	0.728	0.652	0.553

This year it is 10½ per cent. less than in 1881, heretofore the year of lowest rate, and 15 per cent. less than in 1884. The increase in traffic so far made good the lower rate last year that the freight earnings were but $327,399 (3½ per cent.) less than in 1884, but they were $3,448,677 (27½ per cent.) less than in 1883, when the traffic was but 5½ per cent. greater, and $5,045,877 (36 per cent.) less than in 1880, since which the traffic has decreased 13½ per cent.

The last year is notable for the coincidence of a light traffic with the lowest rates ever known. The new railroads in the field are likely to prevent for a long time the increase of traffic to the figures prevailing before 1883; but the *rates* of 1883, or something like them, ought to be obtainable, and on through traffic are probably being obtained now.

The working expenses last year were larger than in 1884, the "heroic reduction" of 17 per cent. having been made on this road from 1883 to 1884, which was too great to last.

There was a reduction of $710,078 (5 per cent.) in gross earnings, the passenger earnings falling off $494,354 (11¼ per cent.), the freight earnings $327,399 (3½ per cent.), and the other earnings increasing. This is very different from the course of earnings on the Michigan Central, whose freight earnings decreased more than twice as much as its passenger earnings. The decrease in passenger earnings was 8⅝ per cent. on the Michigan Central and 11¾ on the Lake Shore, while the decrease in freight earnings was 9⅛ per cent. on the Michigan Central and 3½ on the Lake Shore, and in total earnings 8.2 per cent. on the Michigan Central and 5 per cent on the Lake Shore. But the comparative course of the two is shown better by a comparison of last year with 1883, their headlong downward course having lasted for two years:

	1885.	1883.	Decrease.	P.c.
Earnings:				
Passenger.				
Lake Shore	$3,639,375	$4,736,088	$1,096,713	23 3
Michigan Cen	3,162,342	4,207,548	845,206	21.1
Freight:				
Lake Shore	9,031,417	12,480,094	3,448,677	27.6
Michigan Cen	6,906,207	9,472,366	2,556,159	27.1
Total:				
Lake Shore	14,133,506	18,513,656	4,380,150	23.7
Michigan Cen	10,707,395	14,009,767	3,302,372	23.6
Expenses:				
Lake Shore	9,287,537	11,001,854	1,714,317	15.6
Michigan Cen	8,014,603	9,741,638	1,727,035	17.7
Net earnings:				
Lake Shore	4,845,969	7,511,802	2,665,833	35.5
Michigan Cen	2,692,791	4,268,128	1,575,337	37.0

Thus, though the changes from 1883 to 1884 and again from 1884 to 1885, were very different on the two systems, for the entire two years they have been strikingly similar. The Lake Shore lost most freight earnings and reduced expenses most one year, and the Michigan Central the next, and so on, until at the close we find the Lake Shore to have lost 35.5 and the Michigan Central 37 per cent. in net earnings in the two years.

The course of traffic was not so nearly the same. The Michigan Central gained 6 per cent. in freight traffic from 1883 to 1885, while the Lake Shore lost 5 per cent., and in passenger traffic the decrease was 18 per cent. on the Lake Shore and 14 per cent. on the Michigan Central, the latter preserving its traffic better, but not its earnings, because of a larger reduction in the rates received, which were:

	Lake Shore.			Mich. Cen		
	1885.	1883.	Dec.	1885.	1883.	Dec.
Per pass. mile	2.058	2.196	0.138	2.033	2.217	0.184
Per ton mile	0.553	0.728	0.175	0.560	0.830	0.270

The reduction of the passenger rate was 6 per cent. on the Lake Shore and 8 per cent. on the Michigan Central, and the reduction of the freight rate was 23 per cent. on the Lake Shore and 32½ on the Michigan Central. The latter had much the higher freight rate in 1883, but last year it was nearly the same on both.

The Lake Shore report, like the Michigan Central, shows through and local passenger traffic separately, but not freight traffic. The through passenger traffic has decreased largely (22 per cent.) since 1883, while on the Michigan Central the through travel increased no less than 40 per cent. The local passenger traffic decreased 10 per cent. on the Lake Shore and 21½ on the Michigan Central. The differences are probably due to the diversion from the Michigan Central of certain through travel interchanged with the Grand Trunk, which did not occur until 1884, and this supposition is strengthened by the fact that the average through journey was but 464 miles in 1883, against 511 last year.

The Lake Shore has been burning its candle at both ends, for while its net earnings were decreasing, its fixed charges were increasing, on account of the purchase of the Nickel Plate stock. Since 1881 (two years before this purchase) these charges have increased $1,142,081, or 42 per cent., while the net earnings have decreased $1,846,993, or 28 per cent. This has resulted in a decrease of the shareholders' profits (including in them the $250,000 a year for the sinking fund = 50 cents per share), from $8.02 to $1.98 per share.

The future of this company is complicated by its relation to the Nickel Plate; without it the Lake Shore runs the risk of having no profits, and to keep control of it seems likely to require a guarantee of bonds or other contingent obligation that may sometimes take more profits than the two roads can earn. Last year the Lake Shore had all but 15 per cent. of its net earnings ($728,513) absorbed by fixed charges and sinking fund, and it is dangerous to incur any addition to these fixed charges which will not make sure a corresponding increase in net earnings. Last year, it is true, was extraordinarily unfavorable; but it is not safe to make the solvency of a railroad company depend on so unfavorable a year not occurring again.

THE MICHIGAN CENTRAL.

The sorry result of the working of the combined Michigan Central and Canada Southern railroads last year was told pretty accurately just at the close of the year, when earnings and expenses had to be estimated in part. This great property, including 1,515 miles of heavily equipped railroad, was then reported to have earned for its stockholders the sum of $83,000. The complete report now issued shows it to have been only $26,038.34, or $17.20 per mile of road, which we hope not even a Socialist will grudge them. The company had an income of $72,216.50 from investments, however, but this gives the Michigan Central less than 48 cents per share of stock, while the Canada Southern had less than 6 cents per share. That is, the profits of the year were barely sufficient to pay the fixed charges.

But even this woful result was accomplished only by a heroic reduction in working expenses, and chiefly in maintenance expenses, the latter of which have been:

1883.	1884.	1885.
$3,675,597	$3,081,961	$2,647,851

so that last year they were $434,110 (14 per cent.) less than in 1884 and $1,027,746 (28 per cent.) less than in 1883. There is good reason to believe that extraordinary expenditures for maintenance were made in 1883, but, notwithstanding this, the expenditures last year must have been much below the average requirements, as they were probably on three-fourths of the railroads of the United States in that year.

In detail the Michigan Central maintenance expenses for three years have been:

	1883.	1884.	1885.
Rail renewals	$241,651	$162,833	$111,603
Tie renewals	221,045	261,889	205,974
Repairs:			
Roadway and track	1,108,526	1,057,708	836,376
Bridges, culverts and cattle guards	294,764	212,056	201,898
Buildings and fixtures	278,267	193,712	90,403
Docks	53,545	31,559	2,169
Fences, etc	99,621	91,206	92,586
Machinery and tools	32 531	19,061	12,608
Locomotives	495,358	360,210	385,279
Passenger cars	300,910	243,951	232,853
Freight cars	549,379	447,776	476,101
Total	$3,675,597	$3,081,961	$2,647,851

The new rails used were about 8 tons per mile of track in 1883, 4.4 in 1884, and 3.1 last year; and the expenditures for rail renewals were $120, $76 and $52 per mile of track in the successive years. The new ties put in the track were 346 (about) in 1883, 326 the next year, and 245 last year, at which latter rate it would take 10¾ years to renew them all. The other "repairs of roadway and track" have been reduced 21 per cent. since 1884, and 24½ since 1883. In rolling stock repairs the reduction of cost since 1883 has been 20 per cent. for locomotives, 23 for passenger cars, and 13 for freight cars. Other notable decreases since 1883 are 31 per cent. for bridges, etc., 67 per cent. for buildings and fixtures, 96 per cent. for docks, and 61 per cent. for machinery and tools.

The expenses other than repairs and renewals naturally have decreased much less, having been:

1883.	1884.	1885.
$5,810,148	$5,613,298	$5,100,432

In these expenses the decrease since 1884 is 9 per cent., against 14 per cent. in maintenance expenses since 1883 the decrease is 13⅞ per cent. in the above expenses, against 28 per cent. in maintenance.

These great reductions probably could not be continued, and an increase of expenses must be expected this year, as well as an increase of earnings, which the better through rates will afford.

The train and locomotive mileage has been:

	1883.	1884.	1885.
Train-miles	9.889,085	9.842,179	9,749,091
Locomotive miles	14,154,792	13,071,551	12,916,471

There has thus been a reduction in engine mileage of 1.2 per cent. since 1884, and of 8.7 per cent. since 1883, which has favored a reduction in expenses.

The traffic for nine years has been:

	Millions of— Pass. miles.	Ton miles.		Millions of— Pass. miles.	Ton miles.
1878	108.6	841.8	1882	188.8	1,146.4
1879	126.8	1,165 3	1883	180.7	1,141.3
1880	150.0	1,190.1	1884	164.9	1,179.2
1881	176.6	1,078.0	1885	155.6	1,232 5

The passenger traffic has decreased steadily since 1882, and last year was 17½ per cent. less than then, that being the last year the Michigan Central and the Canada Southern were worked separately; but the freight traffic was larger last year than ever before though only 4½ per cent. more than in 1884, and 3½ per cent. more than in 1880. Indeed the aggregate freight traffic has been remarkably even ever since 1878, notwithstanding the great changes in the circumstances, which have affected especially the through traffic, which forms the larger part of this company's freight traffic. In those seven years the traffic has varied only between 1,078 and 1,233 millions of ton-miles, while on its near neighbor, the Lake Shore, it has varied from 1,410 to 2,022 millions of ton-miles, and has very greatly decreased since 1881. Compare the freight traffic on the two roads for eight years (millions of ton-miles):

	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.
L. S.	1,340	1,733	1,851	2,022	1,893	1,699	1,411	1,603
M. C.	842	1,165	1,190	1,078	1,146	1,141	1,179	1,233

The Michigan Central (including the Canada Southern) made its gain all at once, which is largely due to the fact that the Canada Southern did not get fairly to work after its bankruptcy until 1879. The Lake Shore continued to gain until after 1881, when it carried 51½ per cent. more than in 1878, but since 1881 this traffic

has fallen off one-fourth, losing nearly one-half of the gain from 1878 to 1881. The Michigan Central last year carried 46 per cent. and the Lake Shore 20 per cent. more than in 1878. The difference in the course of the traffic is probably due largely to the greater effect of the new Nickel Plate on the Lake Shore, though against that we must set the greater effect of the Chicago & Grand Trunk on the Michigan Central. It is also quite probable that the Michigan Central has been readier to take non-paying through freight, and it has had a development of local traffic (as in the northern part of the Lower Peninsula of Michigan) more stable that the growth of iron and coal industries on the Lake Shore.

Altogether we find that within the two years that the Michigan Central has decreased its total working expenses $1,890,000 (20 per cent.), and its maintenance expenses $1,027,000 (28 per cent.); its passenger traffic has decreased 14 per cent., and its freight traffic has increased 6 per cent., the increase in freight traffic just about balancing the decrease in passengers.

The most interesting feature in the Michigan Central report, perhaps, is its statement of through traffic in both directions, and local traffic, and the earnings from each. This has been given now for three years. This has been:

Through freight:	1883.	1884.	1885.
Ton-miles east	393,769,920	389,241,610	433,102,980
Earnings	$2,705,984	$1,628,313	$1,529,314
Per ton-mile	0.687 ct.	0.418 ct.	0.353 ct.
Ton miles west	183,127,990	265,207,270	273,668,498
Earnings	$929,579	$1,147,320	$856,389
Per ton-mile	0.508 ct.	0 433 ct.	0.313 ct.
Tot. ton-miles through	576,897,910	654,448,880	706,771,478
Earnings	$3,635,563	$2.775 633	$2,385,703
Per ton mile	0.630 ct.	0.424 ct.	0.338 ct.
Local freight:			
Ton-miles	564,384,954	524,744,947	525.706.056
Earnings	$5,836,833	$4.845.254	$4,520,504
Per ton-mile	1.034 ct.	0.923 ct.	0.860 ct.
All freight:			
Ton-miles	1,141,282,864	1,179,193,827	1,232,477,534
Earnings	$9,472.366	$7,620,887	$6,906.207
Per ton-mile	0.830 ct.	0.646 ct.	0.560 ct.

We see here that while the total freight traffic increased 6 per cent. from 1883 to 1885, the freight earnings decreased $2,566,159, or 27 per cent., which is enough for $9.13 per share on the Michigan Central and $5.70 on the Canada Southern stock. This has fallen in nearly equal amounts on the through and the local freight earnings, the decrease in the through having been $1,239,860 (34 per cent.), and in the local $1,316,299 (22½ per cent.). But meanwhile the through traffic *increased* 22½ per cent., and the local traffic decreased 6¼ per cent. The road carried 22¾ per cent. more through freight for 34 per cent. less money, the decrease in the average through rate having been from 0.630 to 0.338 cent, or no less than 46 per cent. No wonder that a railroad which carries 57 per cent. of its freight for a third of a cent per ton per mile (equal to 16 cents per 100 lbs. from New York to Chicago) makes only $26,038 for $33,738,000 of stock!

The statement of through freight apparently excludes the considerable quantity carried between Buffalo or Suspension Bridge on the east, and Detroit or Toledo on the west, which takes the same rates as the other through freight, and thus not only reduces the quantity and proportion of what is reported as through freight, but also reduces the reported average rate on local freight. It may also be the cause of the reported decrease in local freight traffic since 1883, as this traffic, which is largely interchanged with the Wabash, has probably grown smaller.

Examination of the currents of through freight in the different directions shows that more than two-thirds of the total increase of through freight since 1883—90½ out of 130 millions of ton-miles—was in west-bound freight. In 1883, 31¾, in 1884, 40½, and in 1885, 38¾ per cent. of all the through freight was west-bound. This great increase in the west-bound movement was doubtless very largely or chiefly due to taking anthracite coal west in grain cars at very low rates, and this has had a powerful effect on the average through rates. This movement began before 1883, and in that year, as well as last year, the average through rate was lower on west-bound than on east-bound freight, which a few years ago would have been astounding.

We may therefore not charge the whole reduction in the through rate nor the whole increase in the through traffic to the railroad wars. A part of it has been due to a well advised reduction of rates in order to attract traffic to cars that otherwise would have been hauled west empty. There has been competition in these as well as in other through rates, however, and we find that the reduction from 0.433 to 0.313 cent in the average west-bound rate from 1884 to 1885 (28 per cent.) resulted in an increase of only 3.2 per cent. in the west-bound traffic, and of the decrease of $390,000 in through freight earnings in this time, $291,000 was on west-bound freight. Of the decrease of $1,250,000 in through earnings since 1883, only $78,000 was from west-bound freight, however.

It further appears that *in amount* the decrease in the average local rates was about half as great from 1883 to 1885 as the decrease in the through rates, 0.174 against 0.334 cent. per ton per mile.

The passenger traffic, we see, has steadily decreased since 1882; but this has been in spite of reductions in the average fare from 2.217 cents per mile in 1883 to 2.101 in 1884 and 2.033 in 1885.

This, however, was largely due to a falling off in the immigrant traffic, which was not one-twelfth as great last year as the year before. The other through passenger traffic was larger last year than in either of the two previous, but the local passenger traffic has decreased very largely. The passenger traffic has been, in passenger miles:

	1883.	1884.	1885.
Through	30,907,182	39,268,161	43,238,823
Emigrant	7,664,175	7,98',358	661,736
Local	142,177,868	117,657,141	111,673,430
Total	180,749,225	164,908,660	155,373,989

This shows the through travel, aside from immigrants, to have been 10 per cent. larger last year than the year before and 40 per cent. larger than in 1883, while the local travel fell off 17 per cent. from 1883 to 1884 and 15 per cent. from 1884 to 1885—21½ per cent. in two years—a very remarkable change for that traffic, which often grows very slowly, but rarely grows smaller. The local fares have been well maintained, averaging 2.343, 2.292 and 2.272 cents per mile in the last three years, successively; but the through fares (exclusive of immigrants) have fallen from 1.97 cents per mile to 1.80 and last year to 1.44 cents. Still the through passengers produced larger earnings last year than in 1883, while there was a decrease of $794,246 in the local passenger earnings meanwhile.

There is only one remedy for this company's disasters, and that is better rates. No growth of traffic will do any good when it is carried at ¼ cent per ton per mile, as was done on this road last year for its through freight. With the through freight rates of 1883, without any change in local freight or any passenger rates, the net earnings would have been increased $2,063,732, which would give $7.34 per share to the Michigan Central and $4.58 to the Canada Southern stock. It is hardly to be expected that so high an average through rate will be had again, without a material reduction in traffic; but there is a considerable amount to be had also from higher through passenger fares and from improvement in the local business.

THE MEXICAN CENTRAL.

The Mexican Central Railway has had its main line in operation now for two years, it having been opened for traffic between El Paso and the City of Mexico April 10, 1884. There are besides this line, 1,224 miles long, 137 miles of other lines, seven miles of which were built in 1885. The chief of these other lines is from the Gulf at Tampico inland toward a junction with the main line, which with it will make a route from the city of Mexico to the Gulf, able to compete with the old Mexican Railway, from Vera Cruz. Only 103 miles of this road are completed now, so that it can get only a little local traffic. (Its earnings last year were $160 and its expenses $215 per mile.) The main line, however, is a long one, and has been open long enough to make some test of the resources of the country under the present circumstances, which are more than usually unfavorable in Mexico. The result cannot be called satisfactory. The gross earnings in 1885 were $3,051,052 in our currency from the 1,224.2 miles of main line and 11.4 miles of the Guanajuato Branch, or $2,469 per mile, and the net earnings $1,308,395, or $1,059 per mile, which is 6 per cent. interest on a capital of $17,650 per mile, while the property stands in the capital account at $84,500,000, or nearly $63,000 per mile; $50,325,000 of which is interest-bearing debt and $36,874,000 first-mortgage bonds, promised 7 per cent. interest when issued. The full interest on the latter is just about double the company's net earnings. The earnings were still light last year, but they have grown considerably since the road was completed, having been in Mexican silver (worth one-seventh less in our currency):

1883	1884.	1885.
$1,959,267	$3,016,070	$3,559,561

The road was not opened through in 1883, and for more than three months of 1884. By including the earnings from freight carried for the company, which was then said to be charged at "the actual cost of hauling only," the gross earnings in 1883, as well as 1884, were made greater than in 1885, when the company, not being engaged in construction, had very little freight to be carried; and the reported net earnings (Mexican currency), including company freight, have been:

1883.	1884.	1885.
$1,595,367	$1,322,764	$1,526,461

The increase in gross earnings last year was almost wholly in freight, there having been a gain of only $2,260 in passenger earnings, while in freight earnings the gain was $518,030, or 29¼ per cent. This is favorable, showing that there has been a growth in business, which is more important than a growth in travel. The export and import freights, for the sake of which chiefly 600 miles or so of the line south of El Paso must have been built (because it could not have been expected to find local support), yielded last year $668,812 (Mexican) gross, or at the rate of $468 per mile in our currency (in which the interest on the debt must be paid). In 1884 the earnings from this freight were only $270,688 Mexican, or $25,550 per month the through line was open, against $55,734 last year; so that there has been a decided growth in this traffic. The freight wholly confined to Mexico did not grow much, having been $1,618,598 last year, against $1,498,692 in 1884, an increase of $119,906, or 8 per cent., which is hardly as much as was to be expected from the connection of the northern half of the line with the capital for three months longer in 1885 than in 1884. On the development of local traffic the road must largely depend for its future profits, and this development evidently has been slow so far, the times, be it remembered, being very bad in Mexico, so that it will be natural for the traffic to be better in an average future year than it was last year.

The traffic statistics given in the Mexican Central report are extremely meagre, and contrast very unfavorably with those of the Mexican Railway report, which are among the best we know for showing the sources of a railroad's income and the way in which different branches of it fluctuate from year to year—or rather from half-year to half-year, for like other English railroad companies, it makes half-yearly reports. The Mexican Central report for 1885 is more barren of traffic statistics than those of previous years, the only clew we get to the amount of business the road has done being the train mileage, which was at the rate of 2¼ trains each way daily over the entire mileage. The train mileage was only 10 per cent. more than the year before, while the earnings were 18 per cent. more.

The passenger trains must be quite light. Their mileage was 56 per cent. greater than the freight train mileage last year, while their earnings were 47 per cent. less. The average earnings (Mexican currency) per passenger train mile were $1.06; per freight-train mile, $3.03. This gives no part of the earnings to the "other" trains, 15½ per cent. of the whole, which probably included a considerable mileage of mixed trains, whose earnings would reduce both of the above averages, but probably would leave the difference between them not much less than the above figures show—nearly three times as great earnings per mile by a freight as by a passenger train. The average working expenses per train-mile were $1.09 Mexican, or 94 cents American, which seems very low for a country like Mexico, and in comparison with the Mexican Railway, whose expense per train-mile is about $4. Whether the Mexican Central maintenance expenses last year were equal to what will be the average necessary expenditures is questionable, however, and the average can hardly be known without a longer experience. With so new a railroad here we should expect the maintenance expenses to be much below the average; but while rails and rolling stock on the Mexican Central should not have required much renewal, the ties have proved extremely short lived in that climate, and floods last year caused considerable expenditures which it is hoped will be exceptional. Nevertheless the expenses of the Mexican Central so far as we can compare them with those of our roads seem very small. Below we have compared some of the items with the similar expenses of the Atchison, Topeka & Santa Fe and the Chicago, Milwaukee & St. Paul, the former having 90 per cent. and the latter 150 per cent. greater train-mileage per mile of road than the Mexican Central, yet being among the great roads of lightest traffic in this country. We have reduced the expenses of the Mexican Central to our currency, one-seventh less than the figures for Mexican silver given in the report:

Per mile of road:	Mex. Cen.	A., T. & S. F.	C., M. & St. P.
Rail renewals	$13	.....	*$65
Tie renewals	136	.....	.....
Other maintenance of road	222	.....	.....
Total maintenance of road	$371	$807	$443
Maintenance of locomotives, each	1,219	1,268	1,380
" " freight cars, "	23	67	.....
" " pass. cars, "	369	841	.....
Fuel per train mile	23 cts.	9.1 cts.	9.9 cts.

*Average of five years.

The rail renewals were, of course, much less than they will be on the average, as they ought to be with a new road laid with steel. The tie renewal expenses would about pay for ties enough to renew a track once in ten years where ties cost 50 cents each, and therefore hardly what the Mexican Central's average must

be. The other maintenance expenses are also low, but probably no lower than on our Southern roads with very light traffic. The maintenance of locomotives is not much different from the American examples cited. The Mexican Central engines seem to be kept busy, for they are credited with an average service of 25,500 train-miles each. The freight car maintenance expenditure is not half the average cost in this country. It was not only $67 per car on the Atchison in 1885, but it was $81 in 1884. The passenger car maintenance was also much below the average. The cost of fuel is one of the great obstacles to cheap transportation in Mexico; it is 2½ times as great per train-mile on the Mexican Central as on the Atchison. If the discovery of coal mines does not give cheaper fuel, the completion of the Tampico line should, for coal from Alabama could be brought there without great cost.

The short life of ties on this road is proving a serious matter, though much of it is due to the poor native wood used. On a section 220 miles long (Silao to Calera), ties, which for the most part had been in track only two years at the beginning of last year, had largely to be renewed—on one section no less than 70 per cent. of them. On the north 767 miles the ties came from this country, and are said to be doing well, though those laid in 1881 are beginning to give out, after four years' service. The General Manager reports 100,000 white cedar ties bought in Michigan for this year, which gives a realizing sense of the difficulty of maintaining a railroad in Mexico.

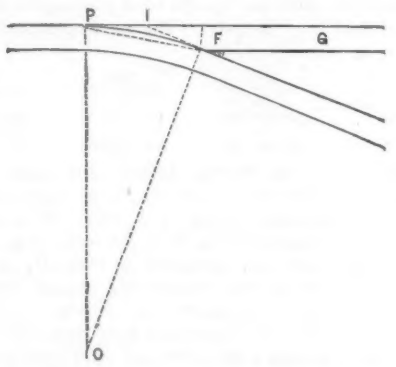
The report gives no figures which show the average rates received by the company for carrying traffic. Compared with those of the Vera Cruz line, they must be extremely low—that line getting an average of about $8 per train-mile, 10 cents per ton per mile, and 3¼ cents per passenger per mile, while the average of the Mexican Central is $1.89 Mexican currency and $1.62 gold per train-mile. The traffic of the old railroad had a very slow growth. The Mexican Central for the first three months of this year has earned gross 3 per cent. less than last year. The General Manager, Mr. E. W. Jackson, who has had long experience in Mexico as General Manager of the Mexican Railway, "hopes to show results at least equal to the past year," and, as to working expenses, "ventures to hope that the monthly average of the past year will only be exceeded in the item of renewal of ties, and in the natural proportions due to increased traffic." The Mexican government ceased paying the promised subsidy just when it was most needed—when the interest on the bonds was all due and the traffic was undeveloped. The certificates issued by the Mexican government remain a debt due by it to the company, but one on which it has suspended payment. What the company needs now is a growth of traffic, for this would not only give it larger earnings, but would hasten the time when the government might resume payment of the subsidy certificates; for the government fails to pay because it is poor, and when the country is prosperous it will no longer be poor; but probably one of the first signs of increasing prosperity of the country will be an increase in railroad traffic and earnings. As yet there are no signs of any considerable improvement, and Mexico is not a country where there is ever any such rapid growth as in our western states; but there are good and bad times there, and the last two years have been very bad times.

COMMON SENSE AND TURN-OUT CURVES.

Every now and then we have a fresh outbreak of discussion and disputation in respect to what seems to be looked on as an ever-new problem—the proper way of laying out frogs and switches, from straight lines and curves, with split switches and stub switches, and Wharton switches, and what not, and with all other imaginable changes of conditions. If the past gives any guarantee for the future, we should need to give merely the silent encouragement of printing everything of this kind which reaches us, *verbatim*, with all the accompanying cuts and formulæ, to keep a page of this journal filled the year round with contributions on that subject alone.

We respectfully decline to do so. In another column we present three or four letters on the subject which, although of the more reasonable class of such letters, we have held over for some time, and finally print chiefly as a text for this sermon. It will be seen that, even in so small an assortment, there is considerable diversity of views, and if we turn to the more elaborate discussions of the matter, which have been embodied in printed books and tables, and in past contributions to this journal, we find a still greater diversity of opinion. We can, without the least difficulty, make out from among these discussions a list of at least twenty different lengths for any number of frog ever heard of, each of which lengths as many different men have advanced as the only proper length of lead for a frog of that number, and plainly stand ready to defend as such against all comers.

It is not probable that all of these different theories have ever had a chance to materialize into an actual lead laid out with real rails and ties, but a great many of them have, and some such materialization of each of these latter is probably pointed to with pride by some one somewhere as positive ocular evidence that



the formula it was laid out by is the only really, truly good formula for getting fine turn-out curves. Seeing one, we admit the fact that it is a good turn-out curve; but then, going to some other road, we find other turn-outs laid out by other formulæ, and which also look well, but yet which have been laid out with leads differing by as much as six inches, or it may be two feet, or it may be even six feet, from the other man's. The puzzled critic may well say, with the Calaveras County citizen who criticised the jumping frog, that he "can't see no p'ints about that man's formula to make it any better than the other man's formula."

Neither are there any. The bottom fact about the whole interminable controversy is that a good turn-out curve may be laid out by almost any of the innumerable formulæ and tables, for the very good and sufficient reason that within quite wide limits it makes no particular difference what the length of the turn-out lead is. Why this is so we hope to show in a few words later, but in the mean time, for the benefit of the "young engineer" who is worried over-much by such little matters, and for the benefit of the "practical man" who is apt to think that such large doses of $a + b = c$, as are often proposed to cure bad turn-out curves, must indicate that something very serious is the matter with them, we may lay down in concise form what we consider covers—

THE WHOLE ART AND MYSTERY OF LAYING OUT TURN-OUT CURVES.

Frogs are made of certain even numbers, and its number is the primary unit to which all else is adjusted.

The number of a frog is its $\frac{\text{length}}{\text{width at back}}$, and is also sometimes called its *proportion*. A "No. 10" frog is one with sides sloping toward each other 1 in 10.

The frog-angle is $\frac{57 \text{ deg. or } 342' \text{ min.}}{\text{No. of frog.}}$

Usual main line frogs are No. 8 and No. 10; sometimes Nos. 9 and 11. Few frogs sharper than No. 6 are used in any location, but as sharp as No. 4 sometimes occur on quick turn-outs from curves.

The theoretical lead = twice No. of frog × gauge = 9.42 × No. of frog, for standard gauge. This assumes the curve to be a simple circular arc, which is not essential for a good curve, *nor does it give the best*, and considers the curve to extend back to the heel of the switch rail of a stub switch.

The lead is always the same, whether the turn-out be from a tangent or a curve.

A difference of not exceeding 10 per cent. in length of lead, especially if the lead be made longer than above, has no appreciable injurious effect on the character of the turn-out curve or on its radius. This is best seen by calling the turn-out curve a parabola, and remembering that whether the tangents of a parabola be equal, or one 20 per cent. longer than the other, will not affect the excellence of the curve, nor, materially, the sharpest radius. Whether the curve be called a circle or parabola will not alter its position on the ground by more than a hair's-breadth.

To lay out the turn-out curve, the frog being in place, and length of lead given, not differing more than 10 per cent. from the theoretical lead:

Practically, the best transit for running in the curve, and the only one much used for fixing points on it, is an experienced eye. Nevertheless, on all kinds of turn-out curves, *whether from tangent or curved main track:*

Offset from gauge side of main rail to gauge side of lead rail at middle point of lead = ¼ gauge, or 14 in.

Offset at ⅓ point of lead = $\frac{1}{9}$ gauge, or 3⅓ in.

Offset at ¾ point of lead = $\frac{3}{9}$ gauge, or 31¾ in.

With stub switches: Main frog to crotch frog = 0.3 of theoretical lead; length of switch rail = 0.3 of lead and as much longer as convenient; main frog to head-block = 0.7 of lead. Position of crotch-frog not essentially affected by 10 per cent. increase of lead, but somewhat farther from main frog (some 3 per cent.). The back end of switch-rail should be spiked fast for a portion of its length and it will spring into a circular arc.

Calling the switch rail straight, and starting the lead from it as from a tangent, compounds the curve at the head block and makes the switch-rail a tangent to a new arc. Its practical effect is to lengthen the lead by 6 to 10 per cent., which gives a better curve, not because the assumption on which it rests (that the switch-rail remains straight) is true to fact, for it is not, but because it eases the radius of the first half of the curve.

Shortening the lead 10 per cent. requires an equal distance near the frog to be tangent to it, and shortens the turn-out radius and proper length of switch-rail 20 per cent.

Split Switches.—The gauge side of the split rail is straight; therefore it can only be considered, when in place, as a tangent to the true turn-out curve. The point at which the theoretical turn-out curve attains an offset of the width of a rail head (say 2¼ in.) from the main line is 0.8 of the theoretical lead from the frog. Hence, to obtain the same turn-out curve with a split switch as with a stub switch, *the lead should be* $(0.8 \times 9.42 \times N)$ or $7.54 \times N$ + *the length of the planed portion of the head of the point rail.* Split switch leads, in other words, other things being equal, should be a little shorter than stub switch leads. But as all turn-out curves are improved by being a little longer than a simple circular arc requires, a lead fixed by the rule $9.4 \times N$ is good practice for split switches.

Radius.—By the principle of proportional triangles it will be seen that the radius = Lead × No. of frog = (No. of frog)² × gauge. *This only holds on turn-outs from tangents.*

Degree of turn-out curve = (plainly)

$$\frac{\text{frog angle}}{\text{lead in stations of 100 ft.}}$$

$$\frac{57^\circ}{N} \div \frac{2\,N\,g}{100} = \frac{606}{N^2},$$

or, in round numbers: 600 ÷ square of the number of the frog. *If the turn-out be from a curved main track,* ADD to the degree thus obtained the degree of the main curve, if the turn-out is to the inside of the curve; and SUBTRACT it, if to the outside.

If the "young engineer," or the practical man who is puzzled by so much discussion and so many formulæ, will cut out the preceding and stick it in his hat, he will be enabled to discharge any duty of that kind which may fall on him, without any tables, and be sure of doing it creditably. The temptation to enlarge the above somewhat we put aside for the present, but as it may reasonably be demanded that reasons should be given for rules laid down so positively, we will, in a future issue, supplement the preceding by giving the reasons for them, so far as what has been stated does not carry its own explanation.

Our large table of March earnings, published this week, has reports from 89 railroads, having:

	1886.	1885.	Increase.	P. c.
Miles	69,129	67,567	1,562	2.3
Earnings	$34,819,686	$33,967,414	$852,272	2.5
Earn. per mile	504	503	1	0.2

The change is very small, and the gain this year is a little more than the loss from 1884 to 1885 of the 83 roads reporting last year.

For the three months ending with March, 90 roads have this year in the aggregate an increase of 2.1 per cent. in total earnings and a decrease of 0.2 per cent. in earnings per mile, while from 1884 to 1885 83 roads had a decrease of 0.8 per cent. in their total and of 3.7 per cent. in earnings per mile. These are small changes, indicating somewhat less favorable earnings this year than in 1884.

We have had so far reports of April earnings from 40 railroads, in the aggregate as follows:

	1886.	1885.	Increase.	P.c.
Earnings	$15,846,906	$15,588,589	$258,317	1.7

The small increase is favorable so far as it goes, but there was a very large decrease in earnings last year (7 per cent. by 79 railroads), so that the earnings cannot be called positively good this year. Some of the principal roads reporting this week have had the following earnings in April for five years:

	1882.	1883.	1884.	1885.	1886
Can. Pac.	.....	$402,400	$343,967	$692,148	$819,766
St. P., M. & M.	$570,890	812,017	804,999	712,408	611,700
St. P. & Duluth.	63,988	76,795	83,364	61,696	97,492
B., C. R. & N.	178,374	218,253	217,576	239,384	211,634
Cen. Iowa	88,094	100,480	122,760	93,220	95,954
C., St. P., M. & O.	377,288	429,339	567,998	464,892	467,300
Chic. & Alton.	564,860	600,878	607,281	591,637	573,421
Ill. Cen. in Iowa	140,080	156,967	130,703	127,328	135,502
Ill. Cen. in Ill.	499,934	463,307	480,222	451,694	458,235
Ill. Cen., S. Liv.	247,529	285,084	302,608	338,072	272,229
K. C., Ft. S. & G.	.....	134,220	183,241	233,434	243,566
K. C., S. & M.	.....	.....	96,217	131,308	131,230
Gulf, C. & S. F.	66,606	132,203	126,285	85,136	157,600
Den. & R. G.	550,280	596,531	473,349	449,659	485,782
C., L. St. L. & C.	194,474	193,141	197,822	180,999	192,538
Ind., B. & W.	220,616	215,913	168,111	169,892	174,483
Ev. & T. H.	65,272	55,289	60,470	53,947	54,109
C. & W. Mich.	95,640	129,959	141,568	119,521	112,274
Flint & P. M.	188,569	237,517	217,660	168,812	201,255
Det., L. & N.	134,064	136,702	138,526	108,942	101,339
Wabash	1,378,194	1,163,664	1,187,141	867,877	1,028,339
Buff., R. & P.	.....	31,407	81,161	103,083	77,969
Long I.	159,197	170,893	186,506	204,712	216,868
Louis. & Nash.	953,603	947,450	1,125,291	1,158,699	966,600

It is noticeable that while the Northern Pacific and the St. Paul & Duluth make a remarkably good showing for April, the Manitoba earned a seventh less than last year, and nearly a fourth less than in 1883 or 1884. The Chicago & Alton had a moderate decrease; the Southern lines of the Illinois Central a large one; the roads southwest of St. Louis make favorable returns, and so do nearly all the roads east of the Mississippi and south of the Lakes, including the Wabash, whose system reported for the last two years is much smaller than that whose earnings are given for previous years—so much smaller that the lines dropped appear to have earned $282,611 last year. All the lines northwest of Chicago reporting this week have small gains over last year, except the Burlington,

Cedar Rapids & Northern, which with one-fourth more road earned less than in 1883 or 1884.

In the South the Louisville & Nashville has a large decrease, like the Illinois Central.

The through shipments of freight from New York to the West by the trunk lines fell off to a considerable extent in the last week of April, having been for successive weeks, in tons:

Week ending						
Mar. 20.	Mar. 27.	Apr. 3.	Apr. 10.	Apr. 17.	Apr. 24.	May 1
24,030	23,095	21,326	21,097	22,700	21,304	18,523

The change in the last week is greater than is usual from one week to another, but it may have been due to the opening of the canal.

For the month of April these New York shipments have been since 1879:

1880.	1881.	1882.	1883.	1884.	1885.	1886.
84,500	99,057	161,492	86,007	108,632	104,722	92,510

Thus the shipments this year were smaller than in any other since 1880 except 1883, when the Lackawanna shipments were not reported. The decrease from last year, when the rates were 30 per cent. less than now, is 11⅛ per cent., and from 1884, when the rates were the same as now, it is 15 per cent.

For the four months ending with April the New York shipments have been, in tons:

	Jan.	Feb.	March.	April.	Four months.
1878	46,474	53,205	69,035	72,709	241,423
1879	52,503	58,198	74,245	70,960	255,906
1880	85,988	90,498	98,231	84,500	359,217
1881	79,402	81,375	106,673	99,057	366,507
1882	109,742	120,089	167,615	161,492	558,938
1883	81,227	78,737	102,699	86,007	348,670
1884	94,696	96,940	108,436	108,632	408,704
1885	81,775	84,768	107,032	104,722	378,297
1886	81,120	84,976	104,845	92,510	363,451

Thus in January and February the shipments this year were almost exactly the same as last year, in spite of the higher rates, in March they were 2 per cent., and in April 11⅛ per cent. less. Shipments have usually been less in April than in March, but only in 1880 and 1883 was the decrease as large as it was this year. Compared with 1884, when rates were nominally the same as now, the decrease this year was very little more in April than in January or February.

For the four months the shipments this year were 4 per cent. less than last year, 11 per cent. less than in 1884, and doubtless less than in any other year since 1880, the Lackawanna having carried enough in 1883 to make the total larger than this year. The changes since 1879 have been comparatively slight, however, except in 1882, when great shipments of imported iron and extremely low rates swelled them immensely. Rates were openly and generally reduced in 1882 and 1885, but in no other year since 1879 (in these months).

The earnings from this freight must have been about $1,360 this year for every $1,000 last year, and all the increase was clear profit. If business had not been better than last year there must have been, at the advanced rates, a much greater reduction in the shipments. The whole course this year has been favorable except the somewhat large reduction in April, which will be important only if it signalizes the beginning of a period of reduced shipments.

Chicago, Burlington & Quincy Earnings in March.

The March earnings of this road were much smaller this year than last, and therefore they have been characterized as very unfavorable. But the gross earnings were not small this year, and the decrease is due chiefly to the fact that they were extraordinarily large last year, made so largely by the very bad weather in February, which delayed traffic till March, just as the bad weather last January delayed traffic till February.

The mileage worked and the gross and net earnings and working expenses in March have been for seven years:

Years.	Miles.	Gross earnings.	Expenses.	Net earnings.
1880	2,597	$1,732,518	$744,391	$988,127
1881	2,772	1,418,149	752,863	665,286
1882	2,924	1,566,217	929,200	637,017
1883	3,231	2,396,584	1,029,118	1,367,465
1884	3,335	2,106,029	1,021,311	1,084,717
1885	3,467	2,639,109	1,257,169	1,381,940
1886	3,640	2,223,414	1,137,750	1,085,664

The gross earnings this year, though less than last year and in 1883, were 5½ per cent. more than in 1884 and from 28 to 57 per cent. greater than in the other three years. The net earnings also were exceeded only in 1883 and 1885.

Compared with last year, the decreases are:

	Gross earnings.	Expenses.	Net earnings.
Amount	$415,695	$119,419	$296,276
Per cent	15.7	9.5	21.5

While compared with 1884 the *increases* are:

	Gross earnings.	Expenses.	Net earnings
Amount	$117,385	$116,439	$947
Per cent	5.6	11.4	0.1

The decrease in earnings in March was wholly in freight, there having been an increase of 15 per cent. in passenger and of 2½ per cent. in miscellaneous earnings, which make but a little figure in comparison with the great decrease of 22¾ per cent. in freight earnings.

For the three months ending with March the gross and net earnings and working expenses of this railroad have been for the last seven years:

Year.	Gross earnings.	Expenses.	Net earnings.
1880	$3,834,702	$1,896,320	$1,938,382
1881	3,760,918	2,176,749	1,584,169
1882	4,682,351	2,663,421	2,018,930
1883	5,583,790	2,626,654	2,917,135
1884	5,725,262	3,046,865	2,678,397
1885	6,233,508	3,490,350	2,742,158
1886	5,440,410	3,134,190	2,306,220

Thus the gross earnings this year were the smallest since 1882, the working expenses, with the exception of last year, the largest the road has had, and the net earnings the smallest since 1882. Compared with last year the decreases for the three months have been:

	Gross earn.	Expenses.	Net earn.
Amount	$793,097	$356,160	$435,938
Per cent	12.7	10.2	15.9

This is a material decrease, the falling-off in the net earnings for the quarter being just about 57 cents per share of stock outstanding; while compared with 1883 the decrease in net earnings is $610,915, which is about 88 cents per share of the stock then outstanding. In both these years, it should be remembered, the profits were largely in excess of the dividends paid.

For the three months ending with March, the earnings from different sources have been, for four years:

	1883.	1884.	1885.	1886.
Passenger	$1,078,602	$1,160,199	$1,024,096	$1,141,121
Freight	4,328,573	4,262,605	4,809,470	3,914,634
Other	226,110	302,457	399,943	384,655
Total	$5,633,285	$5,725,261	$6,233,509	$5,440,410

The passenger earnings for the three months are 11⅛ per cent. *more* than last year, and 1½ per cent. less than in 1884; the miscellaneous earnings are 4 per cent. less than last year, and 27 per cent. more than in 1884; but the great decrease is in freight earnings, which were 18½ per cent. less than last year, 8 per cent. less than in 1884 and 9½ per cent. less than in 1883.

While the decrease from last year for the three months has been so large, if we go back to the beginning of winter, and take the *four* months beginning with December and ending with March, the result this year will be found much less unfavorable. Gross and net earnings for these four months have been:

	Gross earnings.	Net earnings.
1880-81	$5,312,936	$2,454,775
1881-82	6,587,841	2,052,221
1882-83	7,610,850	4,177,553
1883-84	7,896,180	3,850,187
1884-85	8,293,806	3,790,576
1885-86	7,770,384	3,503,387

While the decrease from last year in gross earnings for the three months ending with March is 12.7 per cent., for the four months it is only 6.3 per cent., and in net earnings the decrease is 15.9 per cent. for the three months and 7.6 per cent for the four months. Generally it will be found that the gross and net earnings for the four months have fluctuated much less than for the three months, and the four months period shows best the actual condition of business of the season, beginning as it does with the close of lake navigation, and the first shipments of the new corn crop, which is so important on this railroad.

With the opening of lake navigation a great corn movement, such as there has often been on this railroad in May, June and later months, becomes possible, but as yet there are no signs of it, the total Northwestern receipts being moderate so far, and not likely to become very large now until farmers are through with their spring planting, in June. In April the circumstances were not especially favorable this year; but there may easily have been an increase of earnings then over last year, for last year the earnings were $574,000 less in April than in March.

Chicago through rail eastward shipments of flour, grain and provisions for the week ending May 8 were doubtless somewhat affected by the freight handlers' strike, though apparently not much, as the reported shipments were very nearly as great as in other recent weeks. Doubtless the strikes had much more effect on the unreported higher class freights than on the flour, grain and provisions, the first two of which come chiefly from connecting roads without change of cars, and then do not need to be "handled" in Chicago.

For five successive years the shipments of flour, grain and provisions for this week have been, by the roads now reporting:

	1882.	1883.	1884.	1885.	1886.
Flour	2,044	4,104	8,167	....	3,136
Grain	9,626	23,983	33,232	.....	6,567
Provisions	6,178	6,997	7,289	....	5,943
Total	17,848	35,004	48,688	74,990	15,646
Chi. & Atlan.	Not open	Not open	4,910	3,510	No rep.

Thus the shipments this year were little more than one-fifth those of the corresponding week of last year and not one-third those of 1884, but were only a little less than in 1882, when traffic was extraordinarily light.

The shipments by this imperfect report in each of the last seven weeks have been, in tons:

	Week ending						
	Mar. 27.	April 3.	April 10	April 17.	April 24.	May 1.	May. 8.
Flour	5,650	5,221	5,083	4,327	3,825	3,988	3,136
Grain	16,502	11,490	7,843	7,280	5,503	6,914	6,567
Provisions	5,800	6,131	6,011	7,037	7,555	6,724	5,943
Total	27,952	22,910	18,937	18,644	16,883	17,626	15,646

The shipments last week are the smallest ever reported; but whether the total shipments were correspondingly small we cannot yet say with certainty. The *average* of the unreported shipments—higher class freights, live stock and dressed beef—are much larger than the totals of the grain, flour and provisions now reported; and these other freights *on the average* are as large now as ever they were; but the strikes last week were likely to reduce the high-class freights more than other freights, and thus the total may have been decidedly smaller than ever before, except possibly in the first week of May, 1881, when a switchman's strike reduced the total (not including live stock) from 58,866 tons in the last week of April to 22,351 tons, and a few weeks in 1882, when this total was also below 23,000 tons.

The fact that the rail rates are 50 cents a barrel from Chicago to New York this year against 30 cents last year did not prevent the railroads from carrying as large a proportion of the flour in the first two weeks that navigation was open, the shipments for the two weeks having been, in barrels:

Year.	By rail.	Down Miss.	By lake.	Total.
1886	299,110	22,761	98,792	420,663
1885	346,426	17,554	127,282	491,263

Thus, in these two weeks 23½ per cent. of the total shipments went by lake this year, against 26 per cent. last year, and 71 per cent. went by rail this year, against 70½ last year. Compared with last year there is a decrease of 13⅜ per cent. in the rail shipments, a decrease of 22½ per cent. in the lake shipments, and an *increase* of 30 per cent. in the river shipments. This is a somewhat surprising showing. The lake shipments were positively large in both years, though Lake Superior ports were not yet open. After it was open last year, however, the lake flour shipments did not increase until late in the fall, probably because accumulated stocks had already been forwarded at the low rail rates of March and April, while production was light. After rail rates were advanced in October there were some large lake shipments, however, as follows:

Week ending.						
Oct. 24.	Oct. 31.	Nov. 7.	Nov. 14.	Nov. 21.	Nov. 28	Dec. 5.
63,897	156,593	109,084	104,217	105,963	152,993	38,435

In two of these weeks the lake shipments were one half of the whole, and the difference between the lake and rail rate was no greater than now. Perhaps when we have the shipments from Lake Superior ports we shall find something like that proportion of lake shipments this year.

The first two weeks of lake navigation reduced the stock of wheat on hand at Chicago 1,689,755 bushels, at Milwaukee 729,590 bushels, at Toledo 358,526, and at Detroit 521,717 bushels. The stock at St. Louis was reduced 228,860 bushels, which was proportionally as great a reduction as elsewhere, but, of course, not due to lake shipments. Meanwhile stocks increased at Duluth. The total decrease of the Western visible supply of wheat in these two weeks was 3,698,253 bushels, or 10⅛ per cent., leaving 32,060,323 bushels yet to be forwarded. The shipments of corn have been about one-half greater than those of wheat in this time, but they have not reduced the visible supply correspondingly, because the corn receipts have been considerable, and the wheat receipts very small. Thus the visible supply of corn at western markets was 8,593,080 bushels April 17, and 7,130,760 May 1, a decrease of only 1,462,320 bushels, only about two-fifths the decrease in the wheat supply, though the corn shipments in these two weeks were 6,300,333 bushels against 4,275,621 of wheat. Thus the corn shipments of these two weeks were equal to seven-eighths of the stock on hand at the close of this time. This shows a good demand for corn, which necessitates a considerable movement over the Western railroads, if not on the Eastern ones. Actually, of the 6,300,333 bushels of corn shipped in the first two weeks of open navigation, only 1,051,496 bushels, or 16⅔ per cent., went by rail. The proportion going in the first week, however, was exceptional, being largely the accumulations which had been stored in vessels for weeks or months, and in the second week 45 per cent. of the corn shipments went by rail.

The week of the opening of the Erie Canal, ending May 1, the shipments of grain from Buffalo were 845,585 bushels by canal and 481,142 bushels by rail, so that more than one-third of the whole went by rail. In that week the Buffalo receipts were 3,707,582 bushels. Only the western section of the canal was open all the week, but this should have permitted all the boats that wintered at Buffalo to clear.

The great accumulations of wheat at Northwestern markets has already been considerably reduced by the lake shipments, the shipments of the two weeks to May 1 having been 4,225,621 bushels, while the receipts were only 1,013,720 bushels.

While the shipments of grain by lake from the Northwest in the week that navigation opened, ending April 24, were the exceptionally large amount of 7,314,064 bushels, which was 4½ times the rail shipments; in the next week the lake shipments were only 1,240,460 bushels, and a third *less* than the rail shipments, which latter were the largest for seven weeks. The smallness of the lake shipments was probably to some extent accidental, as the fleet which wintered at Lake Michigan ports was unusually large, and, therefore, the fleet which wintered at lower lake ports, was unusually small, and it was the latter only which was available in the week to May 1 on its arrival from Buffalo, etc. There are, indeed, signs that the stock of vessels is none too large for the business offering, for lake rates, after having been down to 2¾ cents from Chicago to Buffalo, rose at the close of last week to 3½ cents for wheat and 3¼ for corn.

It is commonly assumed that the season of navigation is as long on Lake Superior as on Lake Michigan, because the Ste. Marie River, the outlet of Lake Superior, is usually open about as soon as the Straits of Mackinaw, the outlet of Lake Michigan. But this year, though the Ste. Marie was ope nearly as soon as the Straits (April 22) Duluth harbor wa

blockaded by ice until May 4, or two weeks later—a material shortening of the season for that port. The opening rate from Duluth could have been very little higher than that from Chicago, for the difference in price at Buffalo and Duluth for the grade of wheat which forms the specialty of Duluth is only five cents.

An illustration of the natural effect of conditions of trade on freight rates, when free to act, is furnished by rates by lake on coal shipped from Buffalo. Recent shipments were made at 50 cents per ton to Chicago, about 950 miles, 25 cents to Duluth, about the same distance, and 25 cents to Toledo, 300 miles. The amount of up freight offering is the principal causes of these differences. From Chicago and Duluth vessels come down with grain, and usually have to return without much cargo; but as they have to return for grain, they do well to accept almost any rate necessary to secure a cargo.

During April the receipts of live cattle and dressed beef at New York were, in tons:

	1886.	1885.	Dec.	P. c.
Live cattle	22,231	28,431	6,200	21.8
Dressed beef	4,561	4,593	32	0.7
Both	26,792	33,024	6,232	15 8

Thus the decrease was almost wholly in cattle, and the deressed beef, which formed but 13.9 per cent. of the whole last year, was 17 per cent. of it this year. This is counting a ton of cattle as equal to a ton of beef, while it affords less than three-fifths as much beef, or about 13,339 tons of beef came on the hoof this year out of a total of 18,900, and 17,059 tons came on the hoof last year out of a total of 21,652, so that the dressed beef formed 24.1 per cent of the supply this year and 21.2 last year. New York, however, consumes a much smaller proportion of dressed beef than the interior Eastern points and Boston.

The Indianapolis Weighing Association, which weighs all car-load freight of the roads at Indianapolis, found in the month of April last that the actual weight of the total 2,315 car-loads weighed was no less than 5,219,723 lbs. in excess of the weight given by the shippers, an average excess of 2,255 lbs. per car, or 7¾ per cent.—a very serious difference. It also appears that the actual average load of the 2,315 cars weighed was 31,215 lbs., which gives a realizing sense of the increase in car capacity in recent years.

All the Southern railroads are now busy with preparations for the approaching change of gauge. All the rolling stock possible has been withdrawn from service for the necessary alterations, and the roads are economizing in train service as much as they can. With most of the Southern lines, especially the cotton carriers, this is the quiet season of the year, and freight is unusually light even for the season.

The British Board of Trade report on the collision which occurred on Jan. 7 at Manor Park Station, on the Great Eastern Railway, has been published, and may be summarized as follows:

"During a dense fog, the 5 p. m. express passenger train from London for Norwich, while stopped by the bursting of a Westinghouse brake tube near the down advanced starting-signal at Manor Park Station, was run into at the rear by the 5:03 p. m. passenger train from Liverpool street for Chelmsford. The report says that this very serious collision between two down fast passenger trains, timed to leave Liverpool Street Station within three minutes of each other, was primarily caused by the mistake of one fog-signalman, and by the want of proper knowledge of his duties on the part of another. The fog-signalman on duty at Manor Park down distant-signal states that after the 5 p. m. train had passed he put down two torpedoes on the rails, and went and stood by his hut, where there was a fire, till he heard the 5:03 p. m. train approaching; that he then went up close to the signal-post, saw, as he thought, the distant-signal light showing white, consequently removed the torpedoes from the rails, and showed the driver a white light as he passed. There is no reason whatever to suppose that the signalman had lowered the Manor Park down distant signal after he had put it up to protect the 5 p. m. train, or that the arm had not responded to the action of the lever in his cabin, but the fogman's mistake was probably caused by his seeing the white light showing between the spectacle and the lamp when he looked up at it from a point about a yard from and on the London side of it. It did not occur to him to examine the position of the balance weight, which was about 4 ft. from the ground; had he done so this would have told him whether or not the signal was at danger. But for this unfortunate mistake of his, the engine of the 5:03 p. m. train would have exploded the torpedoes and the driver would have been prepared to stop at Manor Park home-signal."

During fogs, the invariable practice on English railroads is to employ the trackmen to lay down torpedoes on the rails in accordance with the signals shown on the semaphore posts. These signals are, of course, practically invisible to the engineer of an approaching train, but may be seen by a man standing at the foot of the post, or, should the fog be too dense for this, the position of the lever and balance weight working the signal may be felt. The signalman in the signal cabin continues to work his signals as usual in accordance with the information he obtains from the adjoining signal-boxes as to the line being clear or not. The trackmen who act as "fog-signal men" merely make audible signals, torpedoes or "fog-signals," in accordance with the semaphore signals worked from the distant signal-boxes and temporarily rendered invisible.

It will be observed that this collision occurred owing to the simultaneous existence of four unfavorable conditions. First, a Westinghouse hose pipe burst; second, a dense fog prevailed, rendering the engineer wholly dependent on signals; third, a trackman misinterpreted a signal and thus misled the engineer of the second train; fourth, two fast passenger trains were following one another at only three minutes interval, which is not enough to allow for inevitable contingencies. This portion of the line is, however, being four-tracked, when such close packing will no longer be necessary. The collision shows that no precaution must be neglected if absolute safety is to be secured.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines is given in the current number of the *Railroad Gazette* as follows:

Boston & Albany.—The *Newton Circuit Branch* is completed from Riverside, Mass., east 3 miles.

Eutawville.—Extended from Connor's, S. C., north to Eutawville, 3 miles.

Florida Southern.—Extended from Bartow, Fla., south 45 miles.

Ohio Valley.—Extended from Corydon, Ky., southwest to Morganfield, 13 miles.

Oregon Railway & Navigation Co.—This company's *Pomeroy Branch* is extended eastward to Pomeroy, Wash., 9 miles.

Savannah, Florida & Western.—A branch is completed from Fort White, Fla., northward to Lake City, 23 miles.

Skookum Bay.—Track laid from Skookum, Wash., east 4 miles.

This is a total of 99 miles on 7 lines, making in all 751 miles thus far reported for the current year. The new track reported to the corresponding date for 15 years has been:

	Miles.		Miles.		Miles.
1886	751	1881	1,210	1876	485
1885	401	1880	1,330	1875	2.9
1884	808	1879	665	1874	423
1883	1,396	1878	312	1873	738
1882	2,854	1877	365	1872	1,222

These figures include *main track only*, second or other additional tracks and sidings not being counted.

NEW PUBLICATIONS.

Summer Homes in the Mountains, published by the passenger department of the New York, Ontario & Western road is a very attractive pamphlet, forming a guide to the picturesque and beautiful region traversed by that road. It is of especial interest to sportsmen, who will find many places attractive to them in the wilds of Sullivan County and along the upper Delaware.

TRADE CATALOGUES.

Catalogue of Switch and Frog Department, Variety Iron Works, Cleveland, O.

This is one of the neatest and most business-like catalogues of the kind which we have seen. It opens with a brief and specific statement of the special points of their products for various track uses, and then gives a frog and switch diagram which is on the whole the best and most complete which we have seen, and might fairly be described as "alone worth the price of the volume," if the latter were intended for sale at any reasonable price instead of for free distribution. The entire remainder of the pamphlet is taken up with detail drawings of the various frog and switch patterns manufactured, gotten up in excellent shape.

Master Car-Builders' Association Circulars.

The following circular has been issued from the Secretary's office:

APPLIANCES TO PREVENT THE SLIPPING OF WHEELS, BOTH PASSENGER AND FREIGHT.

The Committee appointed to report on the above subject request that answers to the following questions be sent to their Chairman as early as possible:

1. Have you used or do you know of any appliances being used to prevent the slipping of car wheels?
2. If so, with what results?
3. What would you suggest as a preventive of the slipping of wheels?

M. P. FORD,
H. ROBERTS,
I. P. COULTER, } Committee.

Answers to the circular should be sent to M. P. Ford, Chairman of the Committee, at Columbus, Ohio.

TECHNICAL.

A Palatial Indian Railroad Station.

The Great Indian Peninsular Railroad terminus at Boree Bunder, Bombay, now nearly completed, is one of the finest buildings in India, and is surpassed by few railroad stations in the world. The buildings contain over 40 large offices for the administrative staff of the railroad, including the Freight Superintendent and clerks, the Police, Postal, Audit, Traffic, Engineers', Agents' and Provident Fund departments. The agent, it may be explained, is the representative in India of the board of directors in England, and has therefore the powers of a general manager. These offices vary in size from the Agent's chief clerk's office 23 ft. by 12 ft. to the Agent's general clerk's office 64 ft. by 48 ft. Many of the offices have private dressing and bath rooms attached, a very welcome luxury in the hot climate of India.

The accomodation for passengers is also very complete, including a central hall 82 ft. × 76 ft., two refreshment rooms, 52 ft. × 47 ft and 47 ft. × 25 ft. respectively, four waiting rooms, first and second class for ladies and gentlemen with lavatories, etc., attached. Passengers arriving from up country and wishing to embark on the steamer, can find all their wants well attended to without going to a hotel. The building is handsomely decorated throughout, and great pains have been taken to secure good ventilation, and the best sanitary appliances.

The main staircase to the offices is 8 ft. 6 in. wide, and is surmounted by a Gothic stone dome 40 ft. diameter. The main corridors average 12 ft. wide. The main building forms three sides of a quadrangle inclosing a garden with fountain, etc. The style of architecture is Italian Mediæval Gothic, which is said to be well suited to the climate, the massive stonework giving effectual protection from the sun. Work was carried out partly by European and partly by native contractors and workmen, under the directions of Mr. F. W. Stevens, Chief Engineer and Architect, Mr. S. Khunderas, Assistant Engineer, and Mr. Madharas Janardhan, Surveyor and Overseer. The work has been in continuous progress since 1879, and the total cost of the station and offices will be about $1,250,000.

Importation of British Rails.

An English contemporary, *Iron*, states: "We do not share the optimism of some of our American contemporaries, who think that the makers of the United States have nothing to fear from the competition of British rails. We think that the point at which the latter may be imported into America has very nearly been reached. Taking the price of rails to be now about £3 15s. per ton at the shipping port, and adding 10s. for freight and insurance, and $17 import duty, English rails could be delivered at an Atlantic or Gulf port for $38. It is true that American rails are selling for some $3 less than this figure, but that is the price at the mills, which are often situated at distances from the point of consumption which entail very heavy charges for freightage. And, moreover, there is no sign that bottom has been touched even with the price at 75s., and every half-crown which is reduced upon this brings American orders more and more within the grasp of English manufacturers. With a little improvement in the tone of business generally on the other side of the Atlantic, buyers would doubtless evince a disposition to take advantage of the present favorable circumstances, and then, perhaps, makers would pretty soon have their turn."

Fast Work in a Rolling Mill.

We have received through the kindness of Mr. E. C. Potter, Superintendent of the South Chicago Works of the North Chicago Rolling Mill Co., the following communication and accompanying statement, under date of April 25:

"I take pleasure in sending you a statement of the work of this plant during the past 24 hours, which in every particular is by far the largest work ever produced by any plant in the same time:

Blast Furnace Department.

No. 5 furnace, direct metal	214	gross tons.
No. 6 " "	185	"
No. 7 " "	241	"
No. 8 " "	216	"
Total direct metal	856	"
Cupola metal	226	"
Total metal converted	1,082	"

Bessemer Department.

1st turn, 8 hours, 40 heats	385	"
2d " 8 " 32 "	310	"
3d " 8 " 31 "	295	"
Or, reduced to 12-hour turns, as follows:		
Day turn, 12 hours, 59 heats	570	"
Night " 12 " 44 "	421	"
Total, 24 " 103 "	991	"

Rail Mill Department.

Day turn, 12 hours, 1,803 rails, 60 lbs. per yard	479	"
Night " 12 " 1,443 " " "	380	"
Total, 24 " 3,246 " " "	859	"

"The work done in the week ending April 24, in which our Bessemer department made 4,772 gross tons of ingots, is the largest week's work ever turned out by a single plant with one pit. During that week the following large 24-hour products were made: 906 tons, 856 tons, 916 tons, and 881 tons."
—*Bulletin of the American Iron and Steel Association.*

THE SCRAP HEAP.

Robbing the Grand Trunk.

A dispatch from Toronto, May 11, says: "For months past, and probably for years, there has been a conspiracy among the employés of the Grand Trunk Railway agents in Western Ontario to defraud the comway out of money. It is estimated that not less than a hundred clerks or agents were in the conspiracy, which was carried on very extensively and involved the loss of thousands of dollars to the railway. The company's detectives were unable to ferret out the culprits, and one of Pinkerton's men from New York undertook the work, and to-day gives a report of the result of his efforts. Persons in league with the detective purchased tickets at different points along the road at stations where the agents were suspected. One scheme to defraud the railway was when tickets for a long distance were issued to use blank forms and write on the stub the name of the next station, making it appear that the tickets were issued for only a few miles. The stubs in the audit office were not compared with the tickets taken up and sent in, so that the dishonest agents could pocket the difference between the ticket really issued and the price of a ticket to the next station without fear of detection. Another scheme for robbing the railway was by collusion of the ticket agents with passengers. Several arrests have been made, and it is reported that warrants are out for the arrest of no fewer than 25 employés.

Attempt at Train Wrecking.

A dispatch from Columbus, Ind., May 7, says: "A dastardly attempt was made to wreck the passenger train on the Columbus, Hope & Greensburg Branch of the 'Big Four' this morning, cross-ties being placed with ends downward in a culvert. The train, going at the rate of 20 miles per hour, threw them from the track. This is the third attempt at this same place. A red rag tacked on the fence each day this week is supposed to be connected with the attempt."

A Far Reaching Fire.

A dispatch from Easton, Pa., May 7, says: "A long Lehigh Valley freight train was wrecked at Drake's Creek, 13 miles above Mauch Chunk, to-day by the breaking of an axle. A car load of oil took fire and ignited the other broken cars and merchandise. These burned and twisted the track. Some of the barrels of oil rolled down into the Lehigh river and burned while floating down stream. The kindling wood factory at Bridgeport was destroyed. It gave employment to 150 hands."

A Newspaper Bridge.

The *Scientific American* contains views showing the progress of the Hawkesbury bridge in New South Wales, to which frequent reference has been made in these columns. According to our contemporary, one at least of the piers is above high water, and it is to be hoped rests on a secure foundation 170 ft. below. This is a wonderful example of rapid progress, as the gentleman who is about to make arrangements for the foundations of this bridge has not yet left New York. The war stories of bridges being built while a man's hair turned gray (in a single night), and spare tunnels being carried in the baggage wagons, must hide their

diminished heads before the *Scientific American's* bridge, which is half finished before it is begun.

Boycotting a Railroad.

The Milford & Franklin Railroad announces the withdrawal of two trains daily each way, on the 17th instant. The passenger traffic on the road has lately decreased greatly from a rather unusual cause. A large part of the stock is owned by Mr. George Draper, the prime mover to have the town of Hopedale set off from Milford. Hopedale was incorporated, although opposed by the majority of Milford people, and now the latter have withdrawn their patronage in a great measure from the railroad. When the road was built it opened a line to Boston *via* the New York & New England road, in opposition to the Boston & Albany line *via* Framingham, and the immediate result was a reduction of rates on both roads, greatly benefiting Milford. There is a rumor that the Albany road would like to get control of the Milford & Franklin line, and if that should be accomplished, or if for any reason the road should cease operations, the result would injure none but Milford people.—*Boston Evening Record.*

Watering Stock.

Wall street was much excited the other day on a report that a gentleman in Kansas had patented an apparatus for watering stock. An exclusive license to use the patent was for a short time a valuable privilege. It was then discovered that the invention was intended to alleviate the suffering of cattle during a long, thirsty railroad journey. Presumably, the members of the stock exchange never feel this way. A diet of lambs is both meat and drink, and the price of the Kansas invention subsided to zero instanter.

Blowing Down a Bridge.

In a tornado which struck Kansas City, Mo., on May 11, the second span from the north end of the bridge over the Missouri opposite that city was blown into the river, the piers being left apparently uninjured. The span which was carried away is a complete wreck, and it will take some time to repair the damage. The bridge is used by all the railroad lines entering Kansas City from the eastward, except the Chicago & Alton and the Missouri Pacific.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atlantic & Pacific, annual meeting, at the office in Boston, May 20.

Burlington, Cedar Rapids & Northern, annual meeting, in Cedar Rapids, Ia., May 25.

Chicago, Burlington & Quincy, annual meeting, at the office in Chicago, May 19.

Chicago, Milwaukee & St. Paul, annual meeting, at the office in Milwaukee, Wis., June 5, at noon.

Chicago & Northwestern, annual meeting, at the office in Chicago, June 3. Transfer books close May 5.

Chicago, St. Paul, Minneapolis & Omaha, annual meeting, in Hudson, Wis., June 5.

Gulf, Colorado & Santa Fe, special meeting, in Galveston, Tex., June 14.

Milwaukee, Lake Shore & Western, annual meeting, in Milwaukee, Wis., June 9.

New York & Harlem, annual meeting, at the Grand Central Depot in New York, May 18, at noon.

St. Louis, Alton & Terre Haute, annual meeting, at the office in St. Louis, June 7. Transfer books close May 8.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Catawissa (leased to Philadelphia & Reading), 3½ per cent., semi-annual, on the preferred stock, payable May 18.

Cleveland & Pittsburgh (leased to Pennsylvania Co.), 1¾ per cent., quarterly, payable June 1.

Railroad and Technical Conventions.

Meeting and conventions of railroad associations and technical societies will be held as follows:

The *American Society of Mechanical Engineers* will hold its next meeting in Chicago, on Tuesday, May 25.

The *Master Car-Builders' Association* will hold its annual convention at Niagara Falls, beginning on Tuesday, June 8.

The *Master Mechanics' Association* will hold its annual convention in Boston, beginning on Tuesday, June 15.

The *Master Car-Builders' Club* will hold its regular monthly meetings at the rooms, No. 113 Liberty street, New York, on the evening of the third Thursday in each month

The *New England Railroad Club* will hold its monthly meetings at its rooms in the Boston & Albany passenger station in Boston, on the evening of the second Wednesday in each month.

The *Western Railway Club* will hold its regular monthly meetings at its rooms, No. 103 Adams street in Chicago, on the third Wednesday in each month.

Foreclosure Sales.

The *Quincy, Missouri & Pacific* road was sold under foreclosure in St. Louis, May 10, and bought for $1,000,000, by Mr. Edwin Parsons, of New York, representing the bondholders. The road extends from West Quincy, Mo., to Trenton, 136 miles, opposite Brownville, Neb. The road was for some time a part of the Wabash system, but was detached from that system some months ago, when the foreclosure suit was begun. The funded debt includes $925,000 first mortgage bonds and $720,000 income bonds.

The sale of the *Denver & Rio Grande* road under foreclosure will take place in Denver, Col., July 12 next.

The *Painesville & Youngstown* road will be sold at Painesville, O., June 3, under a decree of foreclosure granted at the suit of A. G. Hatry, of Pittsburgh. The road now extends from Fairport, O., to Youngstown, 62½ miles, and is of 3 ft. gauge, and its earnings have been very light. By the last statement the company had $400,000 in first mortgage bonds and $1,000,000 in income bonds. The bondholders, it is understood, have made arrangements to buy in the road and to change it to standard gauge.

The *East Tennessee, Virginia & Georgia* road will be sold in Knoxville, Tenn., May 25, under the decree of foreclosure of the consolidated mortgage, granted by the United States Circuit Court. The sale will include all the property of the company, subject to the lien of the Cincinnati & Georgia mortgage, as it may hereafter be determined by the Court. No bid for less than $10,000,000 will be received, and the purchaser will be required to pay $100,000 cash at the time of sale. The purchaser will also be required to assume all debts of the Receiver.

Transportation in Congress.

The bill to regulate interstate commerce, known as the Cullom bill, was passed by the Senate May 12, and now goes to the House. The bill, as amended and passed, provides for a commission of five persons, to be appointed by the President by and with the advice and consent of the Senate, to carry out the purposes of the bill. Each Commissioner is to have a salary of $7,500 a year, and a Secretary to be appointed by the commission is to have a salary of $3,500 a year. The principal office of the commission is to be at Washington, where general sessions are to be held, but special sessions may be held elsewhere to suit the public convenience, in which case the necessary expenses incurred are to be paid from the Treasury. The first commissioners appointed shall hold office for the term of two, three, four, five, and six years, respectively, the term of each to be designated by the President, their successors, however, to hold for six years each. Not more than three of the five shall be appointed from the same political party. All persons holding stock or bonds of any common carrier, or holding official relations to such corporation, are declared ineligible for appointment. The commissioners must not engage in any other business. The commission is given authority to inquire into the business and management of all common carriers, subject to the provisions of the bill, and to obtain full and complete information as to such business. It may require the attendance and testimony of witnesses and the production of all books, papers, agreements, tariffs and documents relating to any matter under investigation, and may to that end invoke the aid of the United States courts. Persons having complaints to make against any common carrier (of inter-state commerce) shall make complaint in writing to the commission, and the commission shall send the complaint to the common carrier, and require either satisfaction of the complaint or an answer in writing within a reasonable time specified. If reparation be not made within the time stated, the commission shall investigate the complaint. The commission shall also investigate all complaints forwarded to it by state commissions, and may institute inquiries on its own motion. Complaints shall not be dismissed because of the absence of direct damage to the complainant. The reports of the commission shall be in writing, and shall include the findings of fact on which based and a recommendation as to what reparation, if any, should be made by the common carrier to the injured party, and such findings shall be deemed *prima facie* evidence in all judicial proceedings. Whenever any common carrier shall refuse to obey any lawful order of the commission, it is made the duty of the commission to apply to the United States Circuit Court sitting in equity, alleging the violation, and the Court shall hear and determine the matter on short notice and without the formal proceedings of ordinary suits, but so as to do justice; and the Court may, in proper cases, issue writs of injunction or other process, mandatory or otherwise, to restrain further violation of the orders of the commission on the part of the common carrier offending. For such purposes the Circuit Courts shall be deemed always in session.

The bill requires that all charges for any service in transporting passengers or freights or storing goods by common carriers shall be reasonable; it prohibits all rebates and drawbacks and all unjust discrimination, requiring that all persons shall be charged and treated alike for services rendered under substantially similar circumstances and conditions. Every common carrier subject to the bill shall, within 60 days after it becomes a law, file with the commission copies of all its tariffs of fares and freights, including its classifications and terminal charges, and shall make them public so far as the commission may deem practicable. No advance on such published rates shall be made without 10 days' public notice.

The "long and short haul" clause, being section 4 of the bill, reads as follows: "That it shall be unlawful for any common carrier to charge or receive any greater compensation in the aggregate for the transportation of passengers or of the like class and quantity of property subject to the provisions of this act for a shorter than for a longer distance over the same line, in the same direction, and from the same original point of departure, or to the same point of arrival, but this shall not be construed as authorizing any common carrier within the terms of this act to charge and receive as great compensation for a shorter as for a longer distance; provided, however, that upon application to the commission appointed under the provisions of this act, such common carrier may, in special cases, be authorized to charge less for longer than for shorter distances for the transportation of passengers or property, and the commission may, from time to time, make general rules exempting such designated common carrier in such special cases from the operation of this section of this act; and when such exceptions shall have been made and published they shall, until changed by the commission or by law, have like force and effect as though the same had been specified in this section. Any common carrier who shall violate the provisions of this section of this act shall be deemed guilty of extortion, and shall be liable to the person or persons against whom any such excessive charge was made for all damages occasioned by such violation."

The Car Accountants' Association.

The eleventh annual meeting of the Car Accountants' Association will be held at Buffalo, N. Y., on Tuesday, June 15, 1886, at 9 p. m.

The Committee of Arrangements have selected the Genesee House, and very low rates have been secured for delegates and their families.

A cordial invitation is extended to all railroads, fast freight lines and companies or individuals owning cars, to send representatives to the meeting. As questions of the most importance, concerning car service, will be considered, it is hoped that all companies and persons owning cars will be represented.

ELECTIONS AND APPOINTMENTS.

Ashuelot.—At the annual meeting in Keene, N. H., May 11, the following officers were chosen: President, A. B. Harris; directors, Oscar Edward, G. E. Frink, W. H. Haile, E. F. Lane, F. F. Lane, J. Mulligan.

Baltimore & Ohio Operated Lines.—Officers and directors were elected as named below for the following roads, operated by the Baltimore & Ohio, at the annual meetings in Pittsburgh, May 3: *Wheeling, Pittsburgh & Baltimore.*—J. B. Washington, President; F. R. Pinkerton, Secretary; W. H. Ijams, Treasurer; directors, Samuel Burns, John McClure, Wm. Workman, W. W. Smith, H. S. Burgesser, W. C. King, Samuel Spencer. *Salisbury.*—Thomas M. King, President; J. B. Washington, Secretary and Treasurer; directors, H. S. Burgesser, J. B. Caven, John B. Jackson, John McClure, Francis Burns, Robert Garret. *Berlin.*—J. B. Washington, President; F. R. Pinkerton, Secretary; W. H. Ijams, Treasurer; directors, W. H. Koontz, Welty McCullough, Robert Garrett, John H. Harvey, S. Philson, S. A. Philson. *Ohio & Baltimore Short Line.*—T. M. King, President; J. B. Washington, Secretary; W. H. Ijams, Treasurer; directors, Francis Burns, S. K. Harris, F. R. Pinkerton, J. B. Washington, H. S. Burgesser, John McCleeve. *Somerset & Cambria.*—J. B. Washington, President; F. R. Pinkerton, Secretary; W. H. Ijams, Treasurer; directors, Gen. W. H. Koontz, C. C. Mussetman, John G. Harvey, P. E. Chapin, Welty McCullough, Robert Garrett.

Burlington & Missouri River.—D. E. Thompson, Superintendent, announces that "Taking effect May 3, Mr. V. O. English, with headquarters at Lincoln, is hereby appointed Trainmaster of the line from Lincoln to Kearney, Nebraska City and Salem to Beatrice, Crete to Wymoure and De Witt to Tobias. Trainmaster Bignell's jurisdiction will continue over the line from Nebraska City to Grand Island and Central City, including Nebraska City and Lincoln yards and Lincoln to Pacific Junction and Omaha."

Canadian Pacific.—At the annual meeting in Montreal, May 12, the following directors were chosen: Sir George Stephen, William C. Vanhorne, Hon. Donald A. Smith, Richard B. Angus, Edmund B. Osler, Sanford Fleming, H. S. Northcote, R. V. Martinsen, W. L. Scott, Geo. R. Harris, Hon. Levi P. Morton, Richard J. Cross.

Carolina Central.—At the annual meeting in Wilmington, N. C., May 6, the following were elected: President, John M. Robinson; directors, James S. Whedbee, D. W. Oates, I. L. Minis, Severn Eyre, R. C. Hoffman, W. W. Chamberlain, C. H. Roberts, Col. C. Goddard, Maj. R. S. Tucker, Isaac Bates.

Central, of New Jersey.—At the annual meeting in Jersey City, May 7, the following directors were elected: Henry S. Little, John Kean, Henry C. Kelsey, Samuel Sloan, John S. Kennedy, George C. Williams, James Roosevelt, George S. McKenzie and R. S. Hayes.

Chicago & Atlantic.—Mr. E. A. Danielson has been appointed New England Passenger Agent, with office in Boston, in place of E. F. Whitehouse, deceased.

Chicago & Indiana Coal.—The directors are: H. H. Porter, Geo. C. Kimball, E. F. Lawrence, C. W. Hillard, Robert H. Law, Henry Seibert, R. P. Flower, Benj. Brewster, H. A. Gardner, H. R. Bishop and Charles R. Coffin. The office is in Chicago. The company is successor to the Chicago & Great Southern.

Chicago & Iowa.—Mr. James Morris is appointed Acting Master Mechanic in place of Henry S. Bryan, who has gone to the Chicago, Burlington & Northern.

Claremont & White River Junction.—At the annual meeting in Claremont, N. H., May 5, the following officers were chosen: President, H. W. Parker, Claremont, N. H.; Clerk, Wm. H. Sisson, Cornish, N. H.; Treasurer, G. W. Hunt.

Delaware & Hudson Canal Co.—At the annual meeting in New York, May 11, the following directors were chosen: Abiel A. Low, James M. Halstead, Le Grand B. Cannon, James R. Taylor, John Jacob Astor, James Roosevelt, Abraham Van Nest, David Dows, Robert M. Olyphant, Benjamin H. Bristow, John A. Stewart, Frederick Billings, R. Suydam Grant. The new directors are Messrs. Billings and Grant, who succeed R. S. Hone and Hugh J. Jewett.

Eastern in New Hampshire.—At the annual meeting last week the following directors were chosen: Moody Currier, Dexter Richards, Edward L. Giddings, E. H. Goodwin, Frank A. Philbrick, Samuel C. Eastman.

Eel River & Southwestern.—This company has been reorganized with the following officers: President, Alexander McDonald, New York; Vice-President, Robert Smith, Poland, Ind.; Secretary and Treasurer, J. T. Salter, New York.

Erie & Wyoming Valley.—Mr. John B. Smith, General Superintendent of the Pennsylvania Coal Co., has been appointed General Superintendent of this road. Mr. H. A. Mace is appointed Assistant Superintendent, to date from May 15. Mr. Mace has been for a number of years Train Dispatcher at Green Ridge for the Delaware & Hudson Canal Co.; he will have immediate charge of the operation of the road.

Florida Railway & Navigation Co.—Mr. F. B. Papy, for many years General Freight Agent, has been appointed Traffic Manager.

Florida Southern.—Mr. J. A. Larnard has been appointed Superintendent, in place of J. D. Hollister, resigned, with office in Palatka, Florida.

Hanover Junction, Hanover & Gettysburg.—At the annual meeting of the stockholders, held in this place on the 11th inst., the following officers were re-elected: President, A. W. Eichelberger; directors, Reuben Young, Peter Flickinger, William Grumbine, Stephen Keefer, R. M. Wirt, Henry A. Young, Hanover, Pa.; David Wills, Matthew Eichelberger, Gettysburg, Pa.; C. W. Slagle, William Buehler, Baltimore.

Indiana, Bloomington & Western.—At the annual meeting in Indianapolis, May 11, the following Directors were elected: Austin Corbin, Alfred Sulley, Edward Lauterbach, Joseph A. Gargiulo, New York; J. R. Maxwell, Brooklyn; Henry Graves, Orange, N. J.; G. E. Leighton, St. Louis; John L. Fairwell, Robert K. Dow, Claremont, N. H.; Ford W. Peck, Chicago; Fred W. Dunton, Jamaica, N. Y.; J. K. O. Sherwood, Glen Cove, N. Y. Mr. Graves succeeds Charles Stanford, deceased; Mr. Lauterbach succeeds J. B. Edmunds, and Mr. Gargiulo, James Dorr.

Indiana, Illinois & Iowa.—Mr. J. C. McCune has been appointed Auditor, in place of J. H. Carmel, resigned.

Kanawha & Ohio.—The officers of this company are as follows: Thomas R. Sharp, General Manager; G. J. Ermlich, Auditor and Cashier, with offices at Charleston, W. Va.; J. E Story, General Passenger and Freight Agent, Columbus, Ohio.

Kansas City & Southern.—Mr. W. B. Kane has been appointed General Freight and Passenger Agent.

Lancaster & Hamden.—The office is in Lancaster, O. The directors are: Theo. Mithoff, P. Rising, T. R. Tarpey, J. G. Reeves, D. K. Wilson, W. H. Mowery.

Louisville & Nashville.—Mr. C. R. Barnhart has been appointed Superintendent of the Louisville, Cincinnati & Lexington Division, in place of Mr. J. G. Metcalfe, transferred. The office of Superintendent of Transportation, heretofore held by Mr. Barnhart, has been suspended for the present.

Lynchburg, Halifax & North Carolina.—The officers of this company are: President, Peter J. Otey; Vice-President, Wood Bouldin, Jr. Office in Lynchburg, Va.

Marietta Mineral.—H. C. Vincent, previously General Passenger and Ticket Agent, is now General Freight and Passenger Agent; Wm. R. Utley is Purchasing Agent, in place of E. R. Dale, with office at 7 Wall street, New York City; Wm. H. Slack is Auditor, with office at Marietta, Ohio.

Michigan Central.—At the annual meeting in Detroit, May 6, the following board of directors was elected; Cor-

nelius Vanderbilt, William K. Vanderbilt, Edwin D. Worcester, Samuel R. Barger, Chauncey M. Depew, New York; Henry B. Ledyard, Ashley Pond, Detroit; William L. Scott, Erie, Pa.; John V. Farwell, Chicago. The only change from last year's board is the election of Mr. Farwell in place of William H. Vanderbilt.

Minnesota & Northwestern.—Mr. Edward Barrington, of Washington, D. C., has been appointed Division Engineer of the Minnesota & Northwestern Railway, with headquarters at Oelwein, Fayette County, Iowa.

Missouri Pacific.—Mr. C. H. Dent has been appointed Freight Claim Agent, with office in St. Louis. He has been Chief Clerk of the Claim Department some time.

Nanticoke & Wicomico.—The officers of this new company are: John Robinson, President; E. S. Toadvine, Secretary; John W. Welling, Treasurer. The office is at present at Barren Creek Springs, Maryland.

New York, Chicago & St. Louis.—At the annual meeting in Cleveland, O., last week, the following directors were chosen for three years: Chauncey M. Depew, H. McK. Twombley, Cornelius Vanderbilt, William K. Vanderbilt, Frederick W. Vanderbilt.

New York, New Haven & Hartford.—Mr. O. M. Shepard has been appointed General Superintendent in place of Mr. E. M. Reed, resigned. Mr. Shepard has been on the New Haven road for four years past, having previously served on the Gulf, Colorado & Santa Fe, the St. Louis & Southeastern, and as Superintendent of Transportation of the New York & New England. Mr. Shepard came to the New Haven road as Superintendent of the Shore Line Division, to which was afterward added the charge of the Hartford & Connecticut Valley road. About a year ago he was appointed Assistant to the President.

New York, Susquehanna & Western.—At the annual meeting in Jersey City, May 6, the following directors were chosen: Frederic A. Potts, Stephen V. White, Simon Borg, Charles Minzesheimer, Henry Sanford, Robert K. Dow, Henry Marks, John I. Blair, Charles Seidler, Alfred Sully, Garret A. Hobart, Horatio S. Pierce and James M. Hartshorne. The directors met and selected the following officers: President, Frederic A. Potts; Vice-President, Stephen V. White; Secretary and Treasurer, John P. Rafferty.

Northern Pacific.—The following circular from Vice-President and General Manager T. F. Oakes announces officially an appointment already noted; it is dated St. Paul, Minn., April 28: "Mr. J. M. Hannaford, heretofore General Freight Agent, is appointed Traffic Manager of this company, with office at St. Paul, and will assume the duties of such office May 1, proximo. He will have authority in all matters pertaining to the freight and passenger traffic of the Northern Pacific and leased lines, and all officers of the Freight and Passenger departments, who have heretofore reported to the Vice-President and Genecal Manager, will report to the Traffic Manager and be governed by his instructions."

Ohio Valley.—Dr. P. G. Kelsey is President and General Manager, with office at Henderson, Kentucky.

Pensacola & Memphis.—At the annual meeting in Pensacola, Fla., the following were elected directors: L. S. Sellars, S. C. Cobb, S. N. Van Praag, W. B. Wright, Joel P. Walker, E. Watkins, B. H. Warren. The directors elected these officers: L. H. Sellars, President; E. Watkins, Vice-President; S. N. Van Praag, Secretary; S. C. Cobb, Treasurer; W. B. Wright, Auditor.

Pittsburgh, Virginia & Charleston.—At the annual meeting in Pittsburgh last week J. N. Du Barry was re-elected President; D. P. Corwin, Secretary and Treasurer; and George B. Roberts, Edmund Smith, Wister Morris, John P. Green, W. L. Elkins, D. A. Stewart, Charles E. Speer, W. J. Howard, George V. Lawrence, John Scott, Henry D. Welsh and Joseph Walton, directors.

Richmond & Danville.—The following order from General Manager E. B. Thomas is dated Richmond, Va., May 1. "This company, having leased the railway and property of the Charlotte, Columbia & Augusta Railroad Co., to take effect from this date, and the transfer having been made, the said Charlotte, Columbia & Augusta Railroad will hereafter be operated by this company as the South Carolina Division. The following general officers of this company, in their respective departments, will assume charge of the business of that division; Peyton Randolph, Assistant General Manager; Sol. Haas, Traffic Manager; J. H. Drake, General Freight Agent; C. W. Chears, Assistant General Passenger Agent; J. P. Minetree, General Purchasing Agent; W. A. Moody, Car Record and Trace Agent; C. M. Bolton, Chief Engineer, who will have general supervision of surveys and new construction, with such other duties as may from time to time be assigned to him by the General Manager; R. D. Wade, Superintendent of Motive Power, who will have general supervision of the Motive Power Department of the South Carolina Division.

"The following division officers, with offices at Columbia, S. C., will, under direction of the respective heads of departments, remain in charge as heretofore: G. R. Talcott, Superintendent; J. H. Green, Master Mechanic; D. Cardwell, Assistant General Freight and Passenger Agent.

"Instructions to agents and connections in regard to the Accounting Department will be issued by the Comptroller."

An order precisely similar extends the authority of the general officers over the Columbia & Greenville Railroad, hereafter to be known as the Columbia & Greenville Division. The division officers are the same as those of the South Carolina Division.

A third order extends the jurisdiction of the general officers over the Western North Carolina road, now called the Western North Carolina Division. The division officers in this case are as follows: V. E. McBee, Superintendent, Asheville, N. C.; G. M. Gates, Master Mechanic, Salisbury, N. C.; W. A. Turk, Assistant General Freight and Passenger Agent, Asheville, N. C.; J. W. Wilson, Consulting Engineer, Morganton, N. C. Mr. Wilson will perform such duties as may from time to time be assigned him.

St. Louis, Arkansas & Texas.—The officers of this company (successor to the Texas & St. Louis) are: J. W. Fordyce, President; J. H. Benedict, First Vice-President; R. C. Kerns, Second Vice-President; J. S. Wells, New York, Secretary; C. D. Drake, St. Louis, Treasurer; H. G. Allis, Auditor. The headquarters of the company will be in St. Louis.

St. Louis & San Francisco.—At the annual meeting in St. Louis, May 12, the following directors were elected: Jesse Seligman, C. P. Huntington, Jay Gould, Boyce Gray, Russell Sage, I. E. Gates, John Paton, Horace Porter, George Coppell, William F. Buckley, Edward T. Winslow, Walter L. Frost, C. W. Rogers. Messrs. Coppell and Paton are new directors.

Sinnemahoning Valley.—The officers of this company are as follows: F. H. Goodyear, President; E. O. Cheney, Treasurer; C. D. R. Stowitz, General Freight and Passenger Agent, with offices at Buffalo, N. Y.; L. Taggert, Superintendent, Keating Summit, Pa. (P. O. address, Forrest House, Potter County).

Texas & St. Louis.—The office of Mr. A. S. Dodge, General Freight and Passenger Agent, will hereafter be in St. Louis. Mr. Dodge will have charge of the through business, while the local business will be conducted at the office at Texarkana, as heretofore

Texas Trunk.—At the annual meeting in Dallas, Tex., May 4, the following directors were chosen: John L. Henry, J. E. Schneider, A. Sanger, T. L. Marsalis, W. G. Mowry, Dallas; W. W. Wagley, Philadelphia: Frank L. Russ, New York. The new directors met and elected the following officers: John L. Henry, President; J. E. Schneider, Vice-President; W. G. Mowry, Treasurer and General Manager; W. H. Gleason, Secretary and Auditor.

Utah Central.—At the annual meeting in Salt Lake last week the following directors were chosen: Chas. Francis Adams, Jr., John Sharp, F. L. Ames, Sidney Dillon, Frank G. Brown, Henry McFarland, Feramorz Little, Horace S. Eldredge and P. P. Shelby.

Vicksburg & Meridian.—At the annual meeting in Vicksburg, Miss., May 4, the old officers and directors were re-elected.

West Virginia Central & Pittsburgh.—At the annual meeting in Baltimore recently the stockholders elected officers as follows: President, Henry G. Davis; Vice-President, Stephen B. Elkins; directors, H. G. Davis, Wm. Keyser, S. B. Elkins, Wm. P. Whyte, J. N. Camden, A. P. Gorman, W. H. Barnum, Thos. B. Davis, Alexander Shaw, John A. Hambleton.

Williamstown & Delaware River.—At the annual meeting in Williamstown, N. J., May 3, this company (controlled by the Philadelphia & Reading) elected the following directors: J. A. Bodine, Wm. H. Brown, Albert Foster, Samuel Garwood, George de B. Keim, A. H. O'Brien, Woodward Warwick.

Wilmington & Northern.—At the annual meeting in Reading, Pa., May 3, the following were elected: President, H. A. Dupont; directors, George Brooke, Wm. Dupont, Richard E. Ely, A. Foster, John S. Gerhard, Charles Huston; Secretary, P. S. Ermold; Superintendent and Treasurer, A. G. McCausland; Chief Engineer, F. L. Hills.

York & Peachbottom.—At the annual meeting in York, Pa., May 3, Charles R. McConkey was re-elected President, with the old board of directors.

PERSONAL.

—Mr. Alfred Sully has retired from his position as Vice-President of the New York, Susquehanna & Western Co., on account of the pressure of other business.

—A Portland dispatch reports that Mr. John Muir has resigned his position as General Manager of the Oregon Railway & Navigation Co. to accept a position on the Chesapeake & Ohio road.

—It is reported that Mr. W. K. Niver has resigned his position as Superintendent of the Syracuse & Binghamton and the Oswego & Syracuse divisions of the Delaware, Lackawanna & Western.

—Mr. D. J. Barnes, recently with the Wisconsin Central road, has accepted the position of Engineer of the Chicago Passenger Railway, a new line in that city, which expects to increase its mileage largely during the present year.

—Col. T. C. Fremont, of Wilmington, N. C., died suddenly at Memphis, Tenn., May 4. Colonel Fremont was 70 years old, and was by profession a civil engineer. He was connected with the construction of the Wilmington, Charlotte & Rutherford, now the Carolina Central, and of several other lines in North and South Carolina. He was for some years in charge of the government works for improvement along the coast line between Wilmington and Savannah. At the time of his death he was in charge of the construction of the new government building at Memphis. His death is said to have been caused by heart disease.

—Mr. Charles F. Woerishoffer died suddenly in New York, May 10. He was known as an active operator in stocks on a very large scale, being one of the heaviest speculators in Wall street, and at different times has been the owner of very large interests in the Denver & Rio Grande, the Oregon Railway & Navigation Co., the Northern Pacific and many other roads. He has also figured actively in several reorganization schemes. Mr. Woerishoffer's connection with railroad properties, however, has been entirely that of a speculator. He never took any active part in the management of any of the railroads in which he was concerned, hardly ever, in fact, serving as a director.

—Mr. Ezra M. Reed has resigned his position as General Superintendent of the New York, New Haven & Hartford road. He will still retain, however, his position as Vice-President of the company. Mr. Reed began his railroad career 43 years ago as a locomotive engineer on the Baltimore & Ohio. From that road he went to the Philadelphia & Reading, and was shortly afterwards made Master Mechanic of the Port Richmond shops. He left the Reading road to go to Cuba in 1846, but returned to the United States two years later, and was made Master Mechanic of the old Hartford & New Haven road. In 1853 he was made Superintendent of that road, and continued in that position until it was consolidated with the New York & New Haven, when he was made General Superintendent of the consolidated line, and two years later was chosen Vice-President also. Mr. Reed, after his long continued service, now feels the need of some relief from the more active duties of his position.

TRAFFIC AND EARNINGS.

Southwestern Railway Association.

The earnings on business in the Southwestern Railway Association during the month of March were as follows:

Lines.	West-bound.	East-bound.	Total.
C. & A	$98,658	$60,058	$158,717
C., B & Q.:			
Quincy line	73,182	32,948	106,131
Hopkins line	31,740	6,088	37,808
H. & St. J.	7,886	4,295	12,182
C., R. I. & P.	82,075	10,735	92,810
W., St. L. & P.	91,473	80,306	171,779
Mo. Pac	13,963	45,009	58,972
Totals	$398,960	$239,443	$638,402
C., B. & Q., B. & Pts.	4,983	20,053	25,037
S. & L. T. S. & W. Ex. Pts.	1,217	886	2,103
M. P. Jc. & Pts	2,863	7,346	10,210
Grand totals	$408,025	$267,728	$675,754

The Missouri Pacific and the Kansas City, St. Joseph & Council Bluffs were short of their proportions, the other lines over.

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Four months to April 30:				
Buff., N. Y. & Phila.	$738,678	$658,811	I. $79,867	12.1
Buff., R. & Pitts.	380,006	360,154	I. 29,852	5.5
Bur., C. R. & No.	838,688	944,081	D. 105,393	11.2
Canadian Pac.	2,415,581	2,005,378	I. 410,203	20.4
Central Iowa.	388,861	391,788	D. 2,927	0.7
Chi. & Alton	2,284,383	2,456 645	D. 172,262	7.0
Chi. & Nor'west.	6,734,232	6,749,854	D. 15,622	0.2
Ch., St. P., M. & O.	1,725,113	1,562,211	I. 162 903	10.4
Chi. & W. Mich.	417,135	372,786	I. 44.349	11.9
Denver & R. G.	1,812,016	1,741.771	I. 70,245	4.0
Det., Lan. & No.	358,276	346,358	I. 11,918	3.4
Ev. & T. Haute.	219,557	212,399	I. 7,158	3.2
Flint & Pere M.	709,797	600,342	I. 109.455	18.2
Grand Trunk.	4,901,516	4,637,158	I. 264,358	5.7
Gulf, Col. & S. F.	293,363	356,775	I. 236,588	66.3
Ill. Central, Ill.	1,882,259	1,971,538	D. 89,299	4.6
So. Division	1,274,074	1,577,701	D. 303.627	19.3
Iowa lines	595,682	487,156	I. 8,526	1.8
Ind., Bloom. & W.	753,378	733.051	I. 20,327	2.8
K. C., Clinton & Spr.	67.801			
K. C., Ft S. & G.	786.259	848.614	D. 62,355	7.3
K. C., Spr. & M.	448.410	588.903	D. 140,493	23.5
Long Island	701,844	666.913	I. 34,931	5.2
Lou., Ev. & St. L.	250,346	207,422	I. 42.924	20.8
Louisv. & Nash.	4,168,792	4,694,272	D. 527,480	11.2
Marq., H. & O.	109 939	84,306	I. 25,633	30.4
Mexican Central.	1,243,545	1,270.247	D. 26,702	2.1
N. Y. City & No.	159,758	121,920	I. 37,833	31.0
N. Y., Ont. & W.	353,028	392,681	D. 139 654	28.0
Oreg. R. & N.	1,325,773	1,102,513	I. 223.260	20.3
St. Jo. & Gd I.	368.516	365.600	I. 2,916	0.8
St. P. & Duluth.	310,953	261.942	I. 49,011	18.7
St. P., M. & Man.	2.033.959	2,145,761	D. 111,802	5.2
Wabash St. L. & P.	3,919,985	3,861,977	I. 58,008	1.5
Three months to March 31:				
Balt & Potomac.	$301.404	$315,151	D. $13,747	4.4
Net earnings.	110,852	116,224	D. 5,372	4.6
Boston & Albany.	1,779,861	1,673.748	I. 106,113	6.0
Net earnings.	638,425	516,986	I. 121,439	23.5
Ches. & Ohio.	872.564	779,778	I. 92,786	11.8
Net earnings.	258,800	177,812	I. 81 078	45.5
Ches., O. & S. W.	369.900	356,232	I. 13 668	3.8
Net earnings.	116,973	93,017	I. 26,957	29.0
Chi., Bur. & Q.	5,440,410	6,233,510	D. 793.100	12.7
Net earnings	2,306,219	2,743.159	D. 436.940	15.9
C., I., St. L. & C.	623,371	597,173	I. 26,198	4.4
Net earnings.	240.813	209,208	I. 31,605	15.1
Dayton & Ironton.	62,208			
Net earnings.	3,221			
Eliz., Lex. & B. S.	197,192	157.629	I. 37,563	25.0
Net earnings.	59.869	44.188	I. 18 681	45.6
L., N. O. & Tex.	426,998	307,787	I. 119,211	38.7
Net earnings.	94,904	54,987	I. 39,926	72.6
N. Y., New Haven & Hart.	1,635,964	1,525,733	I. 110,231	7.2
Net earnings.	570,015	720,645	D. 150,630	20.9
Two months to Feb. 28:				
Oreg. Short Line.	$217,581	$191,019	I. $26,562	13.9
Net earnings.	14,235	24,657	D. 10,432	42.2
Month of February:				
Oreg. Short Line.	$104,330	$89,800	I. $14.730	16.4
Net earnings.	3,076	*6	I. 3,082	....
Month of March:				
Balt. & Potomac.	$106,507	$122,838	D. $16,331	13.5
Net earnings.	39,215	54,606	D. 15,391	28.1
Ches. & Ohio.	338.154	268,774	I. 69,380	25.8
Net earnings.	116,927	63,418	I. 56.509	89.1
Ches., O. & S. W.	139,004	128,528	I. 10,470	8.1
Net earnings.	52,920	38,053	I. 14,869	39.1
Chi., Bur. & Q.	2,223,414	2,639,110	D. 415,696	15.8
Net earnings.	1,085.664	1,381,940	D. 296.276	21.4
C., I. St. L. & C.	228,209	221,186	I. 7,023	3.2
Net earnings.	93,519	88,685	I. 4,834	5.4
Dayton & Iron.	20,581			
Net earnings.	*496			
Eliz., Lex. & B. S.	74,283	53,306	I. 20,977	39.4
Net earnings.	29,458	11,279	I. 18,179	160.9
L., N. O. & Tex.	128,041	109,874	I. 18,167	16.5
Net earnings.	23,987	22,102	I. 1,885	8.6
Month of April:				
B., N. Y. & Phila.	$200.600	$185,900	I. $14,700	8.0
Buff., Roch. & P.	77,969	103,083	D. 25,114	24.4
Bur., C. R. & No.	211,634	239.384	D. 27,750	11.5
Canadian Pac.	819,766	692.148	I. 127,618	18.4
Central Iowa.	95.954	93,220	I. 2,734	2.9
Chic. & Alton	573,421	591,637	D. 18,216	3.1
Chi. & N. W.	1,739,700	1,770,832	D. 31,132	1.8
Chi., S. P., M. & O.	467,300	464,100	I. 3,200	0.7
Chic. & W. Mich.	112,274	119,521	D. 7,247	6.0
Denver & R. G.	485,782	449,659	I. 36,123	8.0
Det., Lan. & No.	101,339	108,942	D. 7,603	7.0
Ev & T. Haute.	54,109	53.947	I. 162	0.3
Flint & Pere Mar.	201,253	168,812	I. 32,443	19.2
Grand Trunk.	1,520,794	1,436,439	I. 84,355	5.8
Gulf, Col. & S. F.	157,600	85,136	I. 72,464	85.3
Ill. Cent., Ill.	458,235	451,694	I. 6,541	1.4
South. Div.	272,229	338,072	D. 65,843	19.4
Iowa lines	135,502	127,328	I. 8,174	6.4
Ind., Bloom. & W.	174,483	169.900	I. 4,583	2.7
K. C., Clint. & S.	18,234			
K. C., Ft. S. & G.	243.566	233,434	I. 10,132	4.3
K. C., Spr. & M.	131,230	131,308	D. 78	0.1
Long Island	216,868	204,712	I. 12,156	5.7
Lou., Ev. & St. L.	63,300	53,119	I. 10,181	19.2
Louisv. & Nash.	966,600	1,158,639	D. 192,099	16.6
Marq., H. & O.	52,021	45,987	I. 6,034	13.1
Mexican Central.	311,389	305,964	I. 5,425	1.7
N. Y. City & No.	42,114	32.603	I. 9,511	29.3
N. Y., Ont. & W.	93,712	143,121	D. 49,409	34.5
Oregon R. & N.	403.400	326,030	I. 77,370	29.4
St. Jo. & Gd. I.	89,706	75,907	I. 13.799	18.1
St. P. & Duluth.	97,492	61,696	I. 35.796	57.8
St. P., M. & Man.	611,700	712,408	D. 100,708	14.1
Wab., St. L. & P.	1,028,339	867,877	I. 160,462	18.5
First week in May:				
Canadian Pac.	$165,000	$120,000	I. $45,000	37.5
Chi. & Alton	138,811	135,836	I. 2.975	2.3
Chi. & East. Ill.	27,882	30,043	D. 2,163	7.2
Chi., Mil. & St. P.	361,000	429,482	D. 68,482	15.9
Chic. & N. W.	384.000	412,300	D. 28,300	6.8
C., I., St. L. & C.	38,299	44,200	D. 5,901	13.4
Illinois Central.	172,500	243,238	D. 80,738	33.2
Iowa lines.	31,400	27,354	I. 4,046	14.9
Louisv. & Nashv.	238,015	248,675	D. 10,660	4.3
Mil., L. S. & W.	40,560	21,785	I. 18,775	86.0
St. L. & S. F.	77,700	72,000	I. 5,700	7.9

* Deficit.

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

Central Passenger Committee.

The next regular meeting of the Central Passenger Committee will be held at 205 La Salle street, Chicago, May 18. Notice is given that motions will be submitted at this meeting to alter or amend several of the by-laws and rules.

Notice is also given that at the regular meeting on June 15 motions will be submitted to alter or amend paragraphs Nos. 22, 23 and 26 of the articles of association.

Coal.

Anthracite coal tonnage for the week ending May 1 was 396,052 tons, against 304,605 last year, an increase of 91,447 tons, or 30 per cent. An attempt has been made to advance prices, but it did not succeed, owing to disagreements among the companies.

Bituminous coal tonnages for the four months ending May 1 are reported as follows:

	1886.	1885.	Inc. or Dec.	P.c.
Cumberland, all lines..	374,057	807,698	D. 433,641	53.7
Hun. & Broad Top	121,587	58.665	I. 62,922	107.2
Bar. R.R. & Coal Co...	68,238	87,928	D. 19,690	22.4
B. Cr., Clear. & S. W..	268,159	216,788	I. 51,371	23.4
Pennsylvania R. R:				
Clearfield	599,166	1,054,540	D. 455,374	43.1
Mountain District....	263,959	169.102	I. 94,857	56.1
Penn and Westmore.	346,474	270,546	I. 75,928	28.1
Minor districts.	414,825	349.548	I. 65,277	18.6
Norfolk & Western....	265,584	172,462	I. 93,122	54.1
Total..... ...2,722,049		3,187,277	D. 465,228	14.6

The effect of the miners' strike is very plainly shown in the decreased tonnages from the districts affected.

Coke tonnages for the four months to May 1 are reported as follows:

	1886.	1885.	Inc. or Dec.	P.c.
Southwest Penna. R. R. ...	634,252	647,786	I. 16,466	2.5
Other districts, Penna. R. R.	267.303	186,677	I. 80,626	43.1
Connellsville, *via* Pa. R. R..	17.044	27,334	D. 10,290	37.7
Total coke.....	948 599	861,797	I. 86,802	10.1

All these tonnages are over the Pennsylvania Railroad, no other company reporting coke shipments. The increase this year has come almost entirely from the newer districts.

The anthracite coal tonnage of the Belvidere Division, Pennsylvania Railroad, for the four months to May 1 was:

	1886.	1885.	Inc. or Dec.	P.c.
Coal Port for shipment....	9,952	9.527	I. 425	4.5
S. Amboy "	159,099	160,529	D. 1,430	0 9
Local points on N. J. divs.,	301,350	295 957	I. 1,393	0.4
Co.'s use " " .	79,288	75,438	I 3,850	5.1
Total	549 689	545.451	I 4,238	0

Of the total this year 460,564 tons were from the Lehigh Region and 89,125 tons from the Wyoming Region.

Actual coal tonnage passing over the Pennsylvania & New York road for the five months of its fiscal year from Dec. 1 to May 1 was:

	1886.	1885.	Inc. or Dec.	P. c.
Anthracite..... 638,971		421.482	I. 217.489	51.6
Bituminous...	77,195	106,217	D. 29,022	27.4
Total.....716,166		527,699	I. 188,467	35.7

The larger part of the anthracite is received from the Lehigh Valley road, of which this line is an extension.

Chicago coal receipts for the four months to April 30 were as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Anthracite	229,841	184.097	I. 45,744	24 9
Eastern bituminous.....	242,437	242,771	D. 334	0.1
Illinois.....	389,560	520 250	D. 130,690	25.0
Indiana.....	220 786	198,701	I. 22.085	11.0
Coke.....	160,325	155.891	I. 4,434	2.9
Total..... 1,242,949		1,301,710	D. 58,761	4.5

There was a large increase in anthracite. There was a heavy decrease in the receipts of Illinois coal, but an increase in the Indiana coal.

Pennsylvania Railroad coal tonnage for the week ending May 8 was:

	Coal.	Coke.	Total.	1885.
Line of road	97,494	78,352	175.846	194,852
From other lines	95,769	519	96,828	70,435
Total...	193 263	78.871	272.134	262,287
Year to May 8.....3,919,864		1,627,470	4,947,334	4,569,430

Increase for the week, 9,847 tons, or 3.7 per cent.; increase for the year, 377,904 tons, or 8.3 per cent.

Cotton.

Cotton movement for the week ending May 7 is reported as follows, in bales:

Interior markets:	1886.	1885.	Inc. or Dec.	P. c.
Receipts....	22.041	8,552	I. 13,489	157.0
Shipments..... ...	43,027	14,957	I. 28.070	187.2
Stock, May 7....	221,127	81,923	I. 139,204	169.8
Seaports:				
Receipts..	39,150	8.633	I. 30,517	354.9
Exports	88,838	40,230	I. 48,608	120.9
Stock, May 7..... . ..	655,303	520,280	I. 135.023	25.8

The total movement from plantations for the crop year to May 7, is estimated at 6,304,738 bales, against 5,559,981 last year, 5,571,781 in 1883–84 and 6,717,564 in 1882–83.

In its summary of the trade for April, the *Commercial and Financial Chronicle* says: "As it will interest the reader to see what has come into sight each month of the season during this and previous years, we have prepared the following, which shows the movement for the last four seasons.

Months.	1885–86.	1884–85.	1883–4.	1882–83.
September.....	485,552	413,836	450 047	402,336
October.....	1,360,870	1,309.111	1,325,716	1.180.761
November.....	1,443.473	1,390,902	1,317,773	1,402 952
December...	1,488,582	1,360,404	1.264.816	1,435,006
January.....	541.793	513,187	453.985	803,565
February.....	479,591	291,751	379,337	664,834
March	301,156	192,903	262,772	518,540
April.....	185,597	83,911	107,153	265.057
Total 8 months.	6,286,574	5,556,007	5,552,599	6.673,051

"The movement up to May 1 shows an increase in the average weight of bales as compared with the same period of the last two years, the average this year being 487.11 lbs. per bale, against 481.11 lbs. per bale for the same time in 1884–85 and 482.11 lbs. per bale in 1883–84."

Indianapolis Car Movement.

The number of cars received and forwarded at Indianapolis has been:

	Week ending—			
	April 17.	April 24.	May 1.	May 8.
1886—Total	17,081	17,592	19,166	17,950
Loaded.....	12,970	13 834	14,503	13,840
1885—Total.....18,270		16,758	16,406	17,609
Loaded.....	13,572	13,533	12,162	13,212

The movement showed a considerable decrease from the preceding week, but a slight gain over the corresponding week last year. The west-bound movement of loaded cars continues unusually heavy.

Colorado-Utah Association.

The earnings on traffic in the Colorado-Utah Association for March were as follows:

Roads.	West-bound.	East-bound.	Total.
C. & A.	$6,470	$4.268	$9,739
C., B. & Q.	24,185	13,533	37,719
C., M. & St. P.	6,142	417	6,559
C. & N. W.	11,456	776	12,232
C., R. I. & P.	14.119	1.659	15,778
M. P.	637	55	693
W., St. L. & P.	8,696	700	9.397
Totals..... . .	$71,709	$20,401	$92,111
C., St. P., M. & O.....	112	3	116
H. & St. J.	42	.....	42
M. & St. L.	82	... .	82
St. L. & S. F	1,967	133	2,100
Grand totals.....$73,914		$20,538	$94,452

The Burlington, the Northwestern and the Rock Island were over their proportions, the other lines short.

Trunk Lines Executive Committee.

The Trunk Lines Executive Committee met in New York May 7, and discussed the award of percentages in the east-bound pool recently made by the Commissioner. The awards, it was understood, were not entirely satisfactory to all the members, and further consideration was postponed until the next meeting, but the divisions will be made on the Commissioner's awards for the present.

Northwestern Traffic Association.

Commissioner George L. Carman has prepared a statement showing the business of the Northwestern Traffic Association from April 1, 1884, to March 31, 1886. It is as follows:

West-bound Traffic.

Roads.	Tons	Revenue.	Per-centages
C., M. & St. P	241,503	$1,254,292	35.3
C. & N. W	234,465	1,098,684	30 9
C., R. I. & P..... ...	182,326	836,295	23.6
C., B. & Q	94 659	360,820	10.2
Total.....	752.653	$3,550.091	100.0
Washburn Route.....	19,060	52,415	2.6
R. I. & P.....	3.846	18,123	0.5
Grand total	775,559	$3,620,630	....

East bound Traffic.

Roads.	Tons.	Revenue.	Percentages.
C., M. & St. P	237,610	$818,578	38.1
C., St. P., M. & O.....	265,043	693,700	32 3
M. & St. L	196,196	636,933	29.6
Total.....	637,849	2,149,212	100 0
Washburn Route....	69,456	151,171	11 3
Grand total.....	707,305	$2,3000,324	....

The following table shows the amount of wheat milled at local points from April 1, 1885, to March 31, 1886:

Roads.	Tons.	Revenue. Less 30 per cent.	Percentages. Act'al	All'd
Chi., M. & St. P.....	38,747	$87,506	55.6	72.5
C., St. P., M. & O...	23,645	52,347	33.2	16.5
M. & St. L.....	8,148	17,582	11.2	11.0
Total.....	70,540	$157,437	100.0	100.0

The negotiations for the reorganization of the Association have not been successful so far.

Norfolk Cotton Presses.

Norfolk proposes to create uneasiness in all other South Atlantic ports—particularly in Charleston and Savannah—by squeezing cotton bales very close. This is to be done by a hydrostatic press. The plan was patented about two years ago. The compress costs $100,000. Norfolk has one, and she has given notice that she intends to create a revolution in the shipment of cotton to foreign ports; and she really intends to reap, together with Newport News, the fruits of the revolution that has been so slyly planned.

The new press alone at Norfolk cost $63,000 and it is warranted to furnish a pressure of 6,000 tons. One-half of that pressure reduces a bale in thickness to 28 in. This, it is claimed, results in a saving of time in loading a ship, and an increase over the old screwing method of nearly one-half in the number of bales in a ship's hold.

It is not expected that this monster will be used on single bales. In other words, the inland presses and the ordinary compresses at ports are to do the same kind of work they have been doing, and when their comparatively feeble efforts are exhausted, the Norfolk monster will complete the work of compression by bunching the bales and preparing them for export.

The advocates of the new system claim it will cheapen the rates of exportation, keep the bales in better condition during the voyage, prevent damage by water through the tightness of packing, render damage by fire almost impossible because no air will be left in the cotton and only two sides will be exposed to every eight or ten bales, and lastly, remove all danger to the ship on account of the swelling of cotton. The opponents of the plan say the proposed pressure will injure the fibre. The doctors disagree as to the effects of an extreme degree of sqeezing upon the fibre. The tests made at our own exposition, under the superintendence of Mr. Barrows, of the Willimantic Co., seemed to show that cotton free of sand or leaves could not be hurt by pressure. It was then claimed that the hardest kind of pressure improved the fibre, instead of injuring it, if the cotton was free of foreign matter. Subsequent tests have not upset this theory. If there is sand in the cotton, however, it is admitted that the proposed pressure would cut the fibre.

The compound bales from the press now in operation at Norfolk can be placed in a ship at the rate of five bales to every unit of its tonnage, but a new press is to be built on the new plan that will admit of eight bales to a ton. Ships of heavy burden will then be in demand—ships that draw 25 ft. of water. Norfolk claims this will bar out even New Orleans, and that Hampton Roads will be the seat of the export trade. It is a very sweeping programme, and a very consolatory one for the ambitious Virginia port; and if it has good foundation, a scramble for hydrostatic presses and for deeper water on the bars may be expected in the rival ports. Forewarned is to be forearmed.—*Atlanta (Ga.), Constitution.*

RAILROAD LAW.

Legal Domicile of a Corporation—Negligence in Seeking a Remedy.

In the case of Gorham and others against the Boston, Hartford & Erie Co. and others, the United States Supreme Court has confirmed the decision of the Circuit Court, sustaining the demurrer filed by the defendant, and holding as follows:

1. Where a company is made up by a consolidation of several distinct corporations, chartered by different states, it has a legal domicile in each state and may hold its meeting in any one of them, in the absence of any express statute or law to the contrary, and the action taken at such meeting will be binding on the company.

2. The lower Court was correct in sustaining the demurrer on the ground that the plaintiffs in the case had not begun suit until 14 years after the execution of the mortgage, and was therefore guilty of such negligence as to deprive them of an equitable standing in court.

Voting on Sinking Fund Bonds.

In the case of the New England Life Insurance Co. against Willard P. Phillips and others, trustees of the Eastern Railroad, the Massachusetts Supreme Court decides in favor of the plaintiff. The suit was brought to test the right of the trustees to vote at meetings of the company on certificates of indebtedness bought for the sinking fund. In this case the Court holds as follows:

1. Certificates purchased for the sinking fund and in order to reduce the indebtedness of the company should be canceled upon their purchase, and their retention confers no right upon the trustees to vote upon them in the absence of any express provision to that effect.

2. The injunction asked for in this case is denied for the reason that the proper proceedings to test the legality of the title of directors should be by *mandamus* or *quo warranto*, and the proceedings by injunction should not be resorted to unless there is danger of immediate injury to the interests of the plaintiffs.

OLD AND NEW ROADS.

Atchison, Topeka & Santa Fe.—The subscription to the new stock under the last circular is practically closed, all those having right to subscribe having taken their stock. Applications were received for amounts largely in excess of the new securities offered. This subscription was offered for the purpose of building the new line across the Indian Territory.

Augusta, Gibson & Sandersville.—Work has been resumed on this road, and the grading has been completed from the present terminus at Gibson, Ga., to the Ogeechee River, about 8 miles. Tracklaying has been begun at Gibson, and the grading is being pushed towards Sandersville.

Baltimore & Ohio.—The track of the Philadelphia Extension is now completed from Baltimore to the west end of the Schuylkill River bridge in Philadelphia, and a train was run over the line from Baltimore on May 11. The Schuylkill River bridge, it is expected, will be completed by June 1, but it is not probable that regular trains will be run between Baltimore and Philadelphia before July.

Baltimore & Potomac.—The statement for March and the three months to March 31 is as follows:

	March.		Three months	
	1886.	1885.	1886.	1885.
Earnings..... ....$106,507		$122,838	$301,404	$315,151
Expenses	67,292	68,232	190,552	198,927
Net earnings...	$39,215	$54,606	$110,852	$116,224

For the three months the gross earnings decreased $13,747, or 4.4 per cent., and the expenses $8,375, or 4.2 per cent., leaving a decrease of $5,372, or 4.6 per cent., in net earnings.

Bartlett Land & Lumber Co.—This company is having a survey made for a narrow-gauge railroad through the Bartlett Notch in the White Mountains in New Hampshire, from Georges to the Swift River intervale, a distance of about 8 miles. The road will reach a large body of timber, most of which is owned by the Bartlett Co., and which that company expects to work at its mills.

Beech Creek, Clearfield & Southwestern.—It is stated that the committee of holders of securities has finally completed arrangemnets for the reorganization of this company. The new company will be known as the Beech Creek Railroad Co., the plan involving a sale of the road.

Boston & Albany.—The Newton Circuit Branch is completed and will be opened for traffic in a short time. This branch leaves the main line at Riverside, Mass., and runs nearly due east to a junction with the Newton Highlands branch, forming with this branch a loop line. It is about 3 miles long and is intended to improve the facilities of the company for conducting its suburban traffic, giving it, in effect, 4 tracks for some distance from the Boston terminus. The new branch is double track.

The statements to the New York Railroad Commission give the following figures for the quarter ending March 31 and the first half of the fiscal year from Oct. 1 to March 31:

	Quarter.		Half-year.	
	1886.	1885.	1885–86.	1884–85.
Earnings.....	$1,779,861	$1,673.748	$3,916,010	$3,689.007
Expenses.... ..	1,141,436	1,156,762	2,523,624	2.442,983
Net earnings.	$638,425	$516 986	$1.392,386	$1,246,024
Interest, etc...	237,438	218 590	824,189	884,628
Surplus	$400 987	$298,396	$568,197	$361.396

The gain this year in gross earnings for the half year was $227,003, or 6.1 per cent.; in net earnings, $146,312 or 11.7 per cent.; and in surplus, $206.751, or 57.3 per cent. The dividends paid were 2 per cent. for the quarter and 4 per cent. for the half-year.

Boston, Hoosac Tunnel & Western.—The statement to the New York Railroad Commission for the quarter ending March 31 is as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Earnings.	$134,075	$104,225	I. $29.850	28.7
Expenses.	108,067	120,070	D. 12,033	10.0
Net or deficit... N.	$26,038	D. $15,845	I. $41.883	....
Interest, etc.....	29,506	29.200	I. 306	1.1
Deficit.....	$3,468	$45,045	D. $41,577	92.4

This road is this year earning more than its expenses for the first time, although the net earnings are not yet quite equal to the fixed charges.

Boston & Lowell.—The Boston *Advertiser* says: "Judge Colt, of the United States Circuit Court, has given his opinion in the case of the Nashua & Lowell Railroad Co. *vs.* the Boston & Lowell Railroad Co. *et al.* This bill in equity related to certain transactions growing out of a joint traffic contract entered into between the plaintiff and defendant corporations. The original contract was for three years, and was dated Jan. 29, 1857. By a supplemental contract dated Oct. 1, 1858, the parties agreed to an extension of 20 years. The corporations entered into this contract for the promotion of their mutual interests through a more efficient and economical joint operation and management of their respective roads, and for the better security of their respective investments. After this joint contract large additions in mileage were made and the facilities of the road were increased in various ways. The suit brought related to two transactions which took place under the joint contract, the building of the new passenger station in Boston, commenced in 1870 and completed in 1875, and the purchase of stock of the Lowell & Lawrence and the Salem & Lowell railroads. The plaintiff corporation sought to recover back its share of the joint receipts expended for these purposes, on the ground that such acts were unauthorized and illegal under the joint traffic contract. The main question raised in this case was whether the directors could bind the corporation in respect to the transactions complained of. Judge Colt failed to see why the directors had not the power and accordingly dismissed the case."

Canadian Pacific.—This company's statement of earnings and expenses for March and the three months to March 31 is as follows:

	March, 1886.	Three months.
Earnings..... ....$635,705		$1,621,581
Expenses.....	501,560	1,371,278
Net profits..... .....$134,205		$250,303

"The gain in net profits over the same month last year is $5,677, and from Jan. 1 to March 31, as compared with last year, there is a decrease of $30,076. The gross earnings for March include nothing for the carriage of construction material, as against $28,712 during the same month last year."

Central, of New Jersey.—At the annual meeting, May 7, resolutions offered that the board be instructed to take steps to recover immediately possession of the road under the Vail decision of the Chancellor of New Jersey, were referred to the directors with power to act. A resolution declaring that the company shall enter into no contract to continue

for more than one year without the formal consent of the stockholders was also referred to the board. A resolution was passed instructing the directors to prevent any further use of the New Jersey Central tracks by the Philadelphia & Reading, the North Pennsylvania, or the Delaware & Bound Brook companies, or either of them, unless said companies enter into such a contract as will fully secure the Central adequate payment for such use.

The new board is very little changed from the recent one, the only new directors being Mr. R. S. Hayes, formerly Vice-President of the Missouri Pacific, and Mr. John S. Kennedy, of New York. It is understood that Mr. Kennedy enters the board as a representative of the adjustment and consolidated bondholders. The intention of the new board, it is announced, is to recover possession of the new road as soon as possible and to operate it in the best possible way to promote the interests of its owners, disregarding those of all other companies. Their first object after securing possession of the road, will be to put the property in good condition, and to make up for the depreciation which it has suffered during the continuance of the Reading lease.

Charlotte, Columbia & Augusta.—The following circular from President A. C. Haskell announces formally a change briefly noted last week; it is dated Columbia, S. C., May 1:

"The Charlotte, Columbia & Augusta Railroad Co. having on this day May 1, 1886, leased and conveyed its entire railway and properties to the Richmond & Danville Railroad Co., for a term of years, to commence and take effect on and after this date, notice is hereby given to all officers, employés, and other parties interested, that in pursuance thereof, the said railway and properties have been by me this day delivered to the control and management of the said Richmond & Danville Railroad Co., which company assumes and undertakes to conduct, maintain, and operate the same, and to fulfill and execute all contracts and engagements of the Charlotte, Columbia & Augusta Railroad Co. connected with its current business."

Chicago, Burlington & Quincy.—This company's statement for March and the three months to March 31 is as follows:

	March.		Three months.	
	1886.	1885.	1886	1885.
Passengers	$467,008	$466,397	$1,141,121	$1,024,096
Freight	1,622,875	2,102,604	3,914 634	4,879,471
Other	133,531	130,109	384,655	399,943
Total earn.	$2,223.414	$2.639,110	$5,440.410	$6,233,510
Expenses	1,137.750	1,257,170	3,134,191	3,490,351
Net earnings	$1,085.664	$1,381,940	$2,306,219	$2,743,159

For the three months the gross earnings decreased $793,100, or 12.7 per cent., and the expenses $356,160, or 10.2 per cent., the result being a decrease in net earnings of $436,940, or 15.9 per cent. The loss was in freight earnings, the passenger earnings showing a considerable gain, and the other receipts but little change.

Chicago & Indiana Coal.—This company has been formed by the consolidation of the Chicago & Indiana Co. and the Indiana Railway Co., which was recently organized as successor to the Chicago & Great Southern. The Chicago & Indiana is the corporation which built the extension of the Great Southern road from Yeddo, Ind., to Brazil, and the consolidated company owns the line from Fair Oaks, Ind., southward to Brazil, 124 miles. The capital stock is $4,000,000 preferred and $6,000,000 common. Besides the line now in operation the company intends to build a number of short coal branches.

Chicago & Northwestern.—On the extension of this company's Iowa Midland line grading is now completed from Anamosa, Ia., to Frederika, and tracklaying has been begun. Grading is in progress towards Littleton.

Chicago & Ohio River.—This company announces that it has taken possession as purchaser at foreclosure sale of the line formerly known as the Danville, Olney & Ohio River, and that it will hereafter operate that line. The officers of the road formerly in the employ of the receiver are continued in their respective positions. The road extends from Danville Junction, Ill., southward to Olney, 109 miles. It will be controlled in the Indiana, Bloomington & Western interest.

Chicago Strike.—The strike of the freight handlers on the lines running out of Chicago ended practically on May 7, when there was a full force at work on all the yards. A number of new men had been engaged and many of the strikers returned to work. The freight men were disappointed in failing to secure the assistance of the switchmen, which they had expected. There was trouble for two or three days longer on the Chicago & Western Indiana, where some of the switchmen struck, but that also came to an end by the close of the week.

Cincinnati, Indianapolis, St. Louis & Chicago.—This company's statement for March, giving also the surplus for the nine months of the fiscal year from July 1 to March 31, is as follows:

	1886.	1885.	Increase.	P. c.
arn'ngs	$228,209	$221,186	$7,023	3.2
Expenses	134,690	132,501	2,189	1.6
Net earnings	$93,519	$88,685	$4,834	5.4
Fixed charges	50,000	50,000		
Surplus	$43.519	$38,685	$4,834	12.5
Surplus to Feb. 28	235,968	231,825	4,143	1.8
Total surplus, 9 mos.	$279 487	$270 510	$8 977	3 3

The surplus for the nine months this year is equal to 3.99 per cent. on the stock. The indications are that the surplus for the full year will be over 5 per cent. on the stock.

Cleveland & Canton.—The annual meeting was held in Canton, O., May 12, when an injunction was served restraining the company from electing directors unless the common stock was allowed votes. The injunction was a preliminary one, obtained by a stockholder, who claims that the rules of the company providing that only the preferred stock shall vote are not in accordance with the Ohio law. Two meetings were thereupon held, in one the present board being re-elected by the votes of the common stock, with H. A. Blood as President. In the other directors were chosen by the opposition or Corbin party, who held a majority of the preferred stock. A long litigation over a valueless road will probably result.

Columbia & Greenville.—The following circular from President A. C. Haskell announces officially a change briefly noted last week; it is dated Columbia, S. C., May 1:

"The Columbia & Greenville Railroad Co. having on this day, May 1, 1886, leased and conveyed its entire railway and properties to the Richmond & Danville Railroad Co., for a term of years, to commence and take effect on and after this date. Notice is hereby given to all officers, employés and other parties interested that in pursuance thereof the said railway and properties have been by me this day delivered to the control and management of the said Richmond & Danville Railroad Co., which company assumes and undertakes to conduct, maintain and operate the same, and to fulfill and execute all contracts and engagements of the Columbia & Greenville Railroad Co. connected with its current business."

Connecticut River.—This company is this spring making many improvements in its road-bed and is raising the track at several points to improve the grade.

The trackmen on this road struck last week for an increase of pay to $1.50 per day. The company decided to grant the increase, as all the neighboring roads are now paying that price for the same kind of labor.

Dayton & Ironton.—The statement for March and the three months to March 31 is as follows:

	March.	Three months.
Earnings	$20,581	$62,208
Expenses	21,077	58,974
Net or deficit	D. $496	N. $3,230
Fixed charges	2,463	7,116
Deficit	$2,959	$3,886

For the three months the earnings were $366 gross and $19 net per mile; the expenses were 94.8 per cent. of gross earnings.

Delaware, Lackawanna & Western.—The statement for the leased lines in New York for the quarter ending March 31 is as follows:

	1886.	1885.	Inc. or Dec.	P. c.
Earnings	$1,166,990	$1,027,795	I. $139,195	12.6
Expenses	547,389	526,174	I. 21,215	4.0
Net earnings	$619,601	$501,621	I. $117,980	23.3
Other income		753	D. 753	100.0
Total	$619,601	$502,374	I. $117,227	23.3
Rentals	552.749	546,384	I. 6.365	1.2
Surplus or deficit	S. $66,852	D. $44,010	I. $110,862	

The item of rentals includes interest, taxes and dividends paid as rental on the leased line stocks. These lines show a large increase in earnings this year

Denver & Rio Grande.—The Reorganization Committee has issued a circular stating that all but an inconsiderable amount of the stocks and bonds have been deposited. No more will be received after May 15.

Eastern.—The Massachusetts Supreme Court has given a decision in the case of the New England Life Insurance Co. against Willard P. Phillips and others. This was a suit brought to test the legality of certain votes cast at the last election of directors of this company. Under the settlement in bankruptcy made by this company some years ago, certificates of indebtedness were issued to the creditors, and they were given the right to elect a majority of the board of directors. It was also provided that the surplus earnings of the company should be paid over to the trustees and applied to the payment of the certificates. The trustees have received the surplus earnings and have so applied them, but have not cancelled the certificates paid off, holding them in the sinking fund as a permanent investment, collecting from the corporation the interest accruing on them for the benefit of the sinking fund, and claiming the right, as trustees, to vote on these certificates at the annual election. At the last election there was a contest and the successful candidates were chosen by the votes cast by the trustees, a majority of the outside holders of certificates voting for the opposition candidate. The New England Life Insurance Co., which was the holder of a large amount of these certificates, thereupon brought a suit to test the legality of this action of the trustees, and also asked for an injunction to restrain the directors declared elected by the certificate-holders from acting in that capacity. The Court now decides that it is the duty of the trustees to cancel the certificates as fast as they are paid off by the sinking fund, and the result is that they are not authorized to vote upon them at any meeting. Holding this position, the Court finds it unnecessary to consider the further claim advanced by the plaintiffs in this case, that, even if the certificates might be kept alive for any purpose, it was never intended that they should be voted on by the trustees. The petition for an injunction to restrain the directors from acting is refused, but the practical result of the decision is that, if the votes at the election had been cast in accordance with this decision, the opposition ticket would have been elected. A new election will probably have to be held.

Erie & Wyoming Valley.—Since its completion this road has been operated by the New York, Lake Erie & Western Co., which has furnished train service under a temporary contract, and it has been under the direction of the Superintendent of the Delaware Division of the Erie. From May 15 it will be controlled and operated by the Pennsylvania Coal Co., in whose interest the line was constructed, and it will be under the management of the General Superintendent of that company's railroad line.

Eutawville.—This road is now completed to Eutawville, S. C., 3 miles northward from the late terminus at Connors and 18 miles from the junction with the South Carolina road at Forty-one-mile station. Grading is in progress from Eutawville to Vances Ferry on the Santee River. The name of the junction has been changed to Pregnall.

Evansville & Chicago.—This company has filed articles of incorporation to build a railroad from Evansville, Ind., to Mt. Carmel, Ill., a distance of 40 miles.

Fall Brook Coal Co.—This company makes the following report to the New York Railroad Commission for its leased lines in that state for the quarter ending March 31:

	C., C. & A.		S., G. & C.	
	1886.	1885.	1886.	1885.
Earnings	$140.932	$158,314	$153,250	$172,192
Expenses	86,716	101,146	93,071	93,573
Net earnings	$54,216	$57,168	$60,179	$78,619
Charges	41,713	37,500	51,762	57,606
Surplus	$12,503	$19,668	$8,417	$21,013

The Corning, Cowanesque & Antrim shows a decrease of $17,382, or 11 per cent., in gross earnings and of $2,952, or 5.2 per cent., in net earnings. The Syracuse, Geneva & Corning shows a decrease of $18,942, or 11 per cent., in gross earnings, and of $18,440, or 23.3 per cent. in net earnings.

Florida Southern.—On the extension of this road to Charlotte Harbor, track has now been laid for 45 miles southward from the late terminus at Bartow, Fla. The grading is completed to Punta Gorda on Charlotte Harbor, 30 miles further south, and tracklaying is in progress.

Grand Trunk.—This company's statement for March and the three months to March 31 is as follows:

	March.		Three months.	
	1886.	1885.	1886.	1885.
Earnings	£278,618	£245,764	£736,318	£762,016
Expenses	197,789	197,182	562,781	583,719
Net earnings	£80,829	£48,582	£173,537	£118,297

For the three months the gross earnings increased £34,302, or 4.9 per cent., and the expenses decreased £20,938, or 3.6 per cent., the result being a gain of £55,240, or 46.8 per cent. in net earnings.

The statements for the controlled lines west of Detroit for the three months is as follows:

	C. & G. T.		D., G. H. & M.	
	1886.	1885.	1886.	1885.
Earnings	£141,180	£138.234	£55,698	£47.288
Expenses	119,376	121,623	43,356	40,215
Net earning	£21,804	£16,611	£12,342	£7,073

The Chicago & Grand Trunk had an increase in gross earnings of £2,946, or 2.1 per cent., and in net earnings of £5,193, or 31.3 per cent. The Detroit, Grand Haven & Milwaukee show a gain of £8,410, or 17.9 per cent., in gross earnings, and of £5,269, or 75.3 per cent., in net earnings.

Houston & Texas Central.—A meeting of the general mortgage bondholders was held at the office of the Farmers' Loan & Trust Co., in New York, May 7. A suit for the foreclosure of the first mortgage has already been begun, and at the meeting a committee was appointed to confer with other interests in regard to harmonious action by all the bondholders. The committee consists of Henry Budge, Frederic Taylor, E. B. Van Winkle, Thomas L. Manson, Jr., and L. Von Hoffman. In the general discussion it was said that the holders of prior bonds would probably be willing to accept reduced rates of interest in the event of a peaceful reorganization of the company.

Indianapolis Strike.—The switchmen on the railroads entering Indianapolis struck May 12, nearly all the men going out. The strike originated in the employment of a non-union man on the Vandalia Line, but various demands were made, the Belt Line men asking for eight hours' work. The men were not altogether united, however, and on the next day many of them returned to work, the strike being practically a failure.

Illinois Central.—This company makes the following statement of gross earnings for the four months to April 30:

	1886.	1885.	Av., 1878-84.
Illinois Division	$1,882,239	$1,971.538	$1,870,183
Southern Division	1,274,074	1,577 701	1,237,392
Total lines owned	$3,156,313	$3,549,239	$3,107,575
Dubuque & Sioux City	270,813	263,512	311,655
Iowa Falls & Sioux City	180.105	186.462	183,941
Cedar Falls & Minnesota	44,764	37,182	39,369
Total Iowa lines	$495,682	$487,156	$534,965
Total, all lines	$3,651,995	$4,036,395	$3,642 540

The earnings this year are actual for January and February; partly estimated for March and April. The lines owned show a decrease of $392,926, or 11.7 per cent.; the Iowa leased lines an increase of $8,526, or 1.7 per cent.

Joliet, Aurora & Northern.—Tracklaying on this road was begun last week on the section from Joliet, Ill., to Plainfield, which is all graded. The location of the road has been completed to Aurora and grading parties commenced work at that place last week.

Kansas City, Springfield & Memphis.—The Kansas City & Memphis Railroad & Bridge Co. has been organized by parties connected with this road, for the purpose of building a bridge over the Mississippi River at Memphis, Tenn., and also the necessary approaches and connections on both the Arkansas and the Tennessee sides of the river. The bridge is designed to connect this road with the new Kansas City, Birmingham & Memphis road, which is to extend its line to Birmingham, Ala.

Kentucky Union.—This road is now in operation from Kentucky Union Junction on the Chesapeake & Ohio road to Clay City, a distance of 15 miles.

Lancaster & Hamden.—This company has been organized to build a railroad from Hamden, O., on the Cincinnati, Washington & Baltimore, to Lancaster, a distance of about 50 miles.

Louisville, New Orleans & Texas.—The statement for March and the three months to March 31, is as follows:

	March.		Three months.	
	1886.	1885.	1886.	1885.
Earnings	$128,041	$109,874	$426,998	$307,787
Expenses	104,054	87,772	332,094	252,809
Net earnings	$23,987	$22,102	$94,904	$54,978

For the three months the gross earnings increased $119,211 or 38.7 per cent., and the expenses $79,285, or 31.3 per cent., leaving a gain of $39,926, or 72.6 per cent., in net earnings.

Manhattan.—The statement of this company, which owns the elevated lines in New York city, for the quarter ending March 31 is as follows:

	1886.	1885.	Inc. or Dec.	P. c
Earnings	$1,760,096	$1,672,833	I. $87,263	5.2
Expenses	934,768	904,833	I. 29,935	3.3
Net earnings	$825,328	$768,000	I. $57,328	7.5
Other income	20,985	116,754	D. 95,769	81.9
Total income	$846,313	$884,754	D. $38,441	4.3
Interest, taxes, etc	455,870	441,292	I. 14,578	3.3
Surplus	$390,443	$443,462	D. $53,019	12.0

The dividend for the quarter this year was 1¼ per cent., requiring $390,000 for its payment, and leaving a balance of $443 to income account.

Mexican Railroad Notes.—The following notes are from the *Mexican Financier* of May 1:

It is probable that a concession for a standard gauge railroad from the city of Durango to connect with the Mexican Central at Jimulco will soon be granted, Gov. Flores, of Durango, having personally visited this capital to urge the matter. English capital it is said will build the road.

It is understood that something will soon be done here by the projectors of the Topolobampo Railroad to prevent the forfeiture of the concession. A leading business man of Minneapolis, interested in the road, informs us that the enterprise was begun in good faith and that the projectors have not lost interest in its completion.

The condition of the railroad known as the Matamoros & Monterey is not very favorably commented on by the press of Northeastern Mexico. The road-bed and bridges are reported as in bad order, and, as the road runs northwestward from Matamoros and has no terminus in a thriving town, it does little business. The solution of the financial difficulties of the company would seem to lie in the display of more enterprise and pushing the road, now ending in the wilderness, on to Mier.

Newport News & Mississippi Valley.—General order No. 3, from President C. P. Huntington, dated May 1, says: "To secure the adoption of suitable standards that shall be observed in the construction of equipment and other appliances in the Maintenance of Way and Motive Power departments, designs for all such details shall hereafter be submitted to the president for approval, and shall not, after adoption, be deviated from without his consent. The prosecution of this measure is assigned to Wm. Mahl, Assistant to the President, who will confer with the proper officers of the properties operated by this company in respect to the details and other arrangements appertaining thereto."

New York & New England.—The Supreme Court of the United States has confirmed the decision of the Circuit

Court, sustaining the demurrer filed by this company in the suit to set aside the foreclosure sale of the Boston, Hartford & Erie road on the ground that the mortgage under which the sale was made was not legally authorized or executed. This puts an end for the present to the attempt to invalidate this company's title to the road, although it is said that the suit will be renewed in another form.

New York, Lake Erie & Western.—This company's statement to the New York Railroad Commission for the quarter ending March 31 is as follows:

	1886.	1885.	Inc. or Dec.	P.c.
Earnings	$4,876,310	$4,255,590	I. $620,720	14.6
Expenses	3,630,728	3,387,748	I. 242,980	7.2
Net earnings	$1,245,582	$867,842	I. $377,740	43.5
Other income	165,739	151,296	I. 14,443	9.6
Total	$1,411,321	$1,019,138	I. $392,183	38.5
Charges	1,813,193	1,764,746	I. 48,447	2.7
Deficit	$401,872	$745,608	D. $343,736	46.1

The charges include taxes, rentals and all interest accruing whether actually paid or not.

New York, New Haven & Hartford.—This company's statement to the New York Railroad Commission for the quarter ending March 31 is as follows:

	1886.	1885.	Inc. or Dec.	P.c
Earnings	$1,635,964	$1,525,733	I. $110,231	7.2
Expenses	1,065,949	805,088	I. 260,861	32.4
Net earnings	$570,015	$720,645	D. $150,630	20.9
Interest, etc	204,947	204,947	.....	....
Surplus	$365,068	$515,698	D. 150,630	29.2

The extraordinary increase in working expenses is not explained. The earnings were $6,173 gross and $2,151 net per mile, against $5,757 and $2,719 last year. The expenses this year were 65.2 per cent. of gross earnings, against 52.8 per cent. last year.

New York, Pennsylvania & Ohio.—A London dispatch says that a meeting of holders of securities of this company was held in that city May 11. The Chairman referred to the report presented some time ago, which charged that in the increase in the company's debt since 1871 only a small part represented additions to the property, and suggested that there should be an investigation. A communication from Mr. James McHenry, charging mismanagement, was presented and read. The meeting resolved to circulate this statement.

Norfolk & Western.—This company has left a contract for an extension of the New River Branch 7 miles, to reach additional coal mines beyond the present terminus. Mr. George M. Evans, of Roanoke, Va., is the contractor.

Northern Pacific.—Washington Territory papers report that the temporary line at the Cascade tunnel will not be an ordinary switchback, but will be built on the rack-rail system, somewhat similar to that in use on the Mount Washington railroad and on several mountain railroads in Europe. It is stated that the road on this system will be much shorter and can be more cheaply built. It is expected that this temporary line will be in use for about two years.

At the west end of the Cascade tunnel the heading is in 67 ft., and the east heading is in 279 ft., both being in very hard rock. The work will have to be prosecuted entirely from the headings, as the mountain is too high to permit of the sinking of shafts.

Ogdensburg & Lake Champlain.—In the suit brought by the income bondholders to enjoin the company from paying interest on the bonds of the Lamoille Valley extension road, which it guarantees, the New York Supreme Court has decided that the right of the income bondholders is prior to that of the guaranteed bonds, and that they are entitled to an injunction. An appeal will probably be taken from this decision.

Ohio River.—The contract for the grading of 30 miles of the extension of this road from Parkersburg, W. Va., to Point Pleasant, has been let to John T. Dyer and Charles F. King, of Norristown, Pa., who are to begin work at once.

Ohio Valley.—The track on this road has been completed from Henderson to Morganfield, Ky., a distance of about 25 miles, and trains are running regularly between these points. The grading and tracklaying is pushing south of Morganfield and it is expected that the road will be completed to DeKoven by the 4th of July next. The engineers are in the field making a preliminary survey from DeKoven to Jackson, Tenn., which latter place is the proposed terminus of the road. The first work was done on this road late last fall and considering the bad weather for construction and the fact that this was entirely a new enterprise, the progress made has been very good.

Oregon Improvement Co.—The statement for March and the four months of the fiscal year from Dec. 1 to March 31 is as follows:

	March.		Four months.	
	1886.	1885.	1886.	1885.
Earnings	$186,026	$225,525	$776,529	$897,094
Expenses	149,066	196,160	672,854	743,813
Net earnings	$36,963	$29,365	$103,675	$153,281

For the four months the gross earnings decreased $120,565, or 13.4 per cent., and the expenses $70,959, or 9.5 per cent., leaving a decrease of $49,606, or 32.4 per cent., in net earnings.

Oregon Railway & Navigation Co.—The Pomeroy Branch of this company's railroad lines is now completed to Pomeroy, Wash. Ter., 9 miles eastward of the late terminus and 30 miles from the junction with the main line at Starbuck. Trains will shortly be put upon this branch.

Pennsylvania.—At a meeting of the board in Philadelphia, May 12, the following important recommendations of the Finance Committee were adopted:

"*Resolved*, That for the purpose of providing the necessary capital for construction and equipment expenditures during the year 1886 on the main and leased lines and branches and for the completion and extension of new and auxiliary lines, the cost of which is estimated as follows: Construction work, Pennsylvania Railroad, branches and leased lines, $600,000; real estate, Pennsylvania Railroad, branches and leased lines, $400,000; locomotive engines, passenger equipment, etc., $800,000; new construction on branch and auxiliary lines now in operation, $700,000, and for new branch and auxiliary lines under construction, $1,500,000; aggregate, $4,000,000—the privilege be given to the shareholders of the company of subscribing at par between the 15th and 30th days of June, 1886, for 4 per cent. of their respective holdings as they stand registered on May 12, instant. Shareholders entitled to a fraction of a share may subscribe for a full share. The privilege of subscribing may be sold by any shareholder, and blank forms for such purpose will be furnished on application to the Treasurer. Payments will be required prior to July 1, 1886, for which receipts will be given bearing interest at the rate of 4 per cent. per annum from the date of payment until Nov. 1, 1886, at which time said receipts will cease to bear interest. On and after Nov. 1, 1886, certificates of new stock will be delivered upon surrender of the receipts."

This extra issue of stock makes the total capital of the company about $98,000,000.

Pennsylvania Coal Co.—It is understood that this company will during the summer take up and remove the track of the gravity railroad, which has been used for so many in transporting coal from the company's mines to Hawley. The use of this gravity road as a freight line was given up some months ago, after the completion of the Erie & Wyoming Valley line.

From May 15 this company will operate the Erie & Wyoming Valley road, which has hitherto been operated by the Erie under a temporary contract. This road was built with money furnished by the Pennsylvania Coal Co., and for its use.

Philadelphia & Reading.—President Gowen made application to the United States Circuit Court in Philadelphia, May 11, asking that the Court make an order to stop the sale of the remaining second series 5s pledged as security for the New Jersey Central floating debt. He claims that the small portion of these bonds sold last week had brought only about 25 per cent. of their par value and that any further sale would be very injurious to the interest of the company. After hearing Mr. Gowen's argument the Court refused the motion.

Richmond & Danville.—The following circular announces officially a change briefly noted last week. It is from President A. S. Buford, and is dated Richmond, Va., April 30:

"In execution of the agreement of lease by and between the Western North Carolina Railroad Co. and the Richmond & Danville Railroad Co., of date April 30, 1886, the Richmond & Danville Railroad Co. has this day assumed the control and operation of the Western North Carolina Railroad Co. and all its properties, as heretofore controlled and operated by said company, and will hereafter conduct the same as the Western North Carolina Railroad Division of the Richmond & Danville Railroad. All officers and employés of the said Western North Carolina Railroad Co. are hereby retained in their present service and respective positions, and are requested to continue in the regular discharge of the duties thereof. Returns, reports and requisitions will be made and instructions issued through the regular channels as heretofore employed for such purposes. Further instructions as may be necessary in conducting the operations of the Western North Carolina Railroad Division will be hereafter issued through the General Manager, or other heads of departments, as may be proper and necessary."

Circulars precisely similar in their terms announce the lease from April 30 of the Columbia & Greenville road, which will be known as the Columbia & Greenville Division, and of the Charlotte, Columbia & Augusta road, which will be known as the South Carolina Division of the Richmond & Danville Railroad.

Since the conclusion of these leases and that of the Virginia Midland, the Richmond & Danville Co. operates directly 2,056 miles of road. The only line still remaining in charge of the Richmond & West Point Terminal Co. is the Georgia Pacific road.

St. Louis, Arkansas & Texas.—This company, which is successor to the Texas & St. Louis, is now fully organized. The stockholders have given the directors necessary authority to complete the purchase of that road and to change the gauge of the road from 3-ft. to standard, and to issue securities as provided for in the agreement of reorganization.

St. Paul, Minneapolis & Manitoba.—Duluth dispatches report that this company has let to D. C. Shepherd & Co., of St. Paul, Minn., contract for building a branch from Crookston, Minn., eastward to Leech Lake. This branch, it is understood, is part of the proposed line from Crookston, eastward to Duluth.

Savannah, Florida & Western.—This company has recently completed and opened for business a branch extending from Fort White, Fla., on the Gainesville line, northward to Lake City, a distance of 22 miles.

Securities on the New York Stock Exchange.—The Governing Committee of the New York Exchange has put the following on the lists:

Louisville, New Albany & Chicago, $2,500,000 consolidated mortgage bonds.

Memphis & Charleston, $1,000,000 new 6s of 1924.

Rensselaer & Saratoga, $3,000,000 additional stock.

Rochester & Pittsburgh, Union Trust Co. certificates for stock deposited, to be exchanged for stock of new company whenever it can be legally issued.

St. Louis & San Francisco, $475,000 Fort Smith & Van Buren Bridge bonds.

Skookum Bay.—This road, which is intended to run from Skookum Bay, Wash. Ter., to the Chehallis River, is now completed from Skookum, east, 4 miles. It is at present used chiefly for logging purposes, but is built as a permanent line.

Texas & Pacific.—The plan of reorganization, it is stated, will provide that all issues of bonds except the $167,000 lien held by the state of Texas and the $3,784,000 Eastern Division first mortgage, shall be replaced by an issue of $40,000,000 new 5s, of which $23,000,000 shall be preferred, with interest obligatory, and $17,000,000 income bonds. The plan will be published in a few days.

Union Pacific.—The land sales for April were 39,126 acres, for $191,831. The total sales for the four months to the end of April were 177,844 acres, for $503,645. The sales so far this year have been less than half of those for last year.

The strike of the brakemen on the Western Division of this road obstructed freight traffic for several years, but speedily came to an end. The company brought in a number of new men, and the strikers gave way, most of them returning to work.

Western North Carolina.—The following circular from President A. B. Andrews announces officially a change heretofore noted; it is dated Salisbury, N. C., April 30:

"The Western North Carolina Railroad Co. having on this day, April 30, 1886, leased and conveyed its entire railway and property to the Richmond & Danville Railroad Co. for a term of years, to commence and take effect on and after this date, notice is hereby given to all officers, employés and other parties interested, that in pursuance thereof, the said railway and properties have been by me this day delivered to the control and management of the said Richmond & Danville Railroad Co., which company assumes and undertakes to conduct, maintain and operate the same, and to fulfill and execute all contracts and engagements of the Western North Carolina Railroad Co. connected with its current business."

West Virginia Central & Pittsburgh.—The officers of this company have organized a new corporation, known as the Piedmont & Cumberland Railroad Co., with $500,000 capital stock, for the purpose of building the extension of the road from the present terminus at Cumberland, Md. It is understood that work will be begun on the extension as soon as the location has been completed and the right of way secured.

ANNUAL REPORTS.

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St. Louis & San Francisco.

This company makes the following statement for the year ending Dec. 31, in advance of the publication of the full report. The average mileage worked was 815 miles last year, against 776 in 1884:

	1885.	1884.	Inc. or Dec.	P. c.
Earnings	$4,383,406	$4,643,596	D. $260,190	5.6
Expenses	1,809,633	1,953,577	D. 143,944	7.4
Balance	$2,573,773	$2,690,019	D. $116,246	4.3
Taxes and imp.	140,112	181,801	D. 41,689	23.1
Net earnings	$2,433,661	$2,508,218	D. $74,557	2.9
Interest, sink'g funds, rentals, etc.	1,736,165	1,811,610	D. 75,445	4.1
Surplus	$697,496	$696,608	I. $888	0.1

The operating expenses for 1885 were 41.21 per cent. of gross earnings, and the percentage of all expenses, improvements and taxes 44.48 per cent.

The cost of 2,600 tons of 67 pounds new steel rails laid during the year, to replace old rails, is included in operating expenses. Of the total mileage of the company (815 miles) all but 100 miles is now laid with steel rails.

The bonded indebtedness shows a net increase during the year of $2,133,000. Bonds to the amount of $2,324,000 have been sold and delivered, the same having been previously pledged for borrowed money.

At a special meeting of the stockholders a year ago, it was resolved to increase the common capital stock of the company 50,000 shares, and of this amount 14,543 have been sold, leaving the remainder held in the treasury.

The financial statement shows assets in the treasury of the company amounting to upward of $8,000,000, exclusive of the value of its capital stock not issued, and of that of various corporations obtained under leases of branch lines or otherwise, against which there are liabilities for amounts due for current operations, outstanding pay checks, dividends, accrued interest, etc., amounting to $2,177,400.

Reference is made in the report to the completion of the road of the California Southern Railroad Co. from a point on the Atlantic & Pacific road to San Diego, Cal., on the coast, from which important results are anticipated advantageous to the San Francisco Co. as joint owners with the Atchison Co. of the bulk of the stock of the Atlantic & Pacific.

Michigan Central.

At the close of the last fiscal year, Dec. 31, 1885, this company operated the following lines:

	Main track.	Second track.	Sidings.
Michigan Central, main line	284.07		
" " branches	793.79		
	1,077.86	90.00	384.02
Canada Southern, main line	226.18		
" branches	210.47		
	436.65	30.93	152.69
Total	1,514.51	120.93	536.71

This is a total of 2,172.15 miles of track, of which 1,870.32 miles are laid with steel. There was an increase last year of 9.44 miles of main track and of 21.86 miles of sidings, a total of 31.30 miles of track.

The equipment includes 396 locomotives; 179 passenger 7 dining and 91 baggage, mail and express cars; 6,949 box, 1,166 stock, 40 oil, 608 coal, 95 log, 2,517 flat and caboose cars; 1 pay car; 35 tool, 30 dump and 23 boarding cars.

The condensed balance sheet is as follows:

Capital stock		$18,738,204
Funded debt		15,976,000
Accounts payable		1,907,540
Income account		5,924,212
Total		$42,545,956
Construction account	$39,857,394	
Investments	513,503	
Fuel and supplies	401,233	
Accounts receivable	596,578	
Uncollected earnings	484,724	
Cash	692,224	
		42,545,956

The funded debt includes $1,900,000 Air Line 8s; $500,000 Grand River Valley 6s; $3,576,000 Detroit & Bay City 5s; $8,000,000 consolidated 7s and $2,000,000 consolidated 5s. In addition to these bonds the company pays interest on $4,953,000 leased line bonds and $424,000 Detroit & Bay City guaranteed 8s. The interest on these leased line bonds and other rental charges amount to $592,470 yearly.

The Canada Southern bonded debt includes $14,000,000 first-mortgage 5s and $6,000,000 second-mortgage 5s. The

total amount of funded debt of all the lines worked by the Michigan Central Co. is $41,353,000.

The construction account is made up as follows: Main line, $30,874,604; leased lines, $5,195,468; proprietary lines, $3,791,322; total, $39,857,394.

The earnings for the year were as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Freight	$6,906,207	$7,620,887	D. $714,680	9 4
Passengers	3,162,342	3,464,560	D. 302,218	8.7
Mail and express	546,296	500,816	I. 45,480	9.1
Miscellaneous	92,549	72,814	I. 19,735	27 0
Total	$10,707,394	$11 659,077	D. $951,683	8.2
Expenses	8,014,603	8,959,132	D. 944,529	10.5
Net earnings	$2,692,791	$2,699,945	D. $7,154	0.3
Gross earn. per mile	7,091	7,835	D. 744	9.5
Net " "	1,783	1.814	D. 131	7.3
Per cent. of exps	74.8	76.8	D. 2.0	...

Taxes are included in expenses; they amounted last year to $266,321, or 2.49 per cent. of the gross earnings.

The income account is as follows:

Net earnings, as above		$2,692,791
Interest, main line bonds	$660 000	
" Canada Southern bonds	951,323	
" leased line "	871,120	
Rental, " "	184,310	
		2,666,753
Surplus for the year		$26,038
Paid Canada Southern one-third of surplus		8,679
Balance for Michigan Central		$17,359
Add interest on investments		72,216
Total surplus for the year		$89,575
Balance from previous year		827,293
Total surplus, Dec. 31, 1885		$916,868

The surplus for the year (including interest on investments) was equal to 0.48 per cent. on the stock.

The traffic for the year was as follows:

	1885.	1884.	Inc. or Dec.	P.c.
Passengers carried	2,340,243	2.581.072 D.	240.829	9.3
Passenger-miles	155,573,989	164,908,660 D.	9,334,671	5.7
Tons freight carried:				
Through	1,507.557	1,446,261 I.	61 296	4.2
Local	3,728,719	3.695,336 I.	33,383	0.9
Total	5,236,276	5,141.597 I.	94,679	1.8
Ton-miles:				
Through	706,771,478	654,448,880 I.	52,322,598	7.9
Local	525.706.056	524,744.947 I.	961,109	0.2
Total	1,232,477,534	1,179,193,827 I.	53,283,707	4.5

Of the passengers carried last year 3.7 per cent., and of the passenger-miles 28.2 per cent. were through passengers. Of the through ton-miles 61.3 per cent. were east-bound and 38.7 per cent. west-bound.

The average rates received on this traffic were, in cents:

	1885.			1884.		
	Through.	Local.	Average.	Through.	Local.	Average.
Per pass.-mile.	1.425	2.272	2 0 3	1 626	2.292	2.101
Per ton-mile	0.338	0.860	0 560	0.424	0.923	0.646

The average rate per through passenger-mile last year was: East-bound, 1.521; west-bound, 1.350; immigrant, 0.456; average, 1.425 cents. The average rate per through ton-mile was: East-bound, 0.353; west-bound, 0.313; average, 0.338 cent.

The locomotive service for the year was as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Passenger train	3.542.637	3,875,002	D. 3 2.365	8 6
Freight	6.207.354	5,967.177	I. 240,177	4 0
Service and switch	3.166.480	3,229,372	D. 62,892	1.9
Total	12,916,471	13,071,551	D. 155,080	1.2

Locomotives last year ran 1.325 miles to each revenue train mile. Locomotive service cost 15.34 cents per mile run.

The capital stock remains unchanged. The funded debt of the Michigan Central Co. proper is also unchanged. The leased line bonds show a decrease of $1,277,000, caused by the payment of that amount of first-mortgage bonds of the Jackson, Lansing & Saginaw, guaranteed by this company, which matured July 1, 1885, and was paid from the proceeds of sales of the land grant of that road, thus reducing the annual interest payment of the company $102,160.

The report of the Land Department shows that from the Jackson, Lansing & Saginaw grant there were sold last year 5,936 acres, for $42,657. Timber sales amounted to $55,203, making a total of $97,860. The total cash receipts for the year were $219,562, and expenses $51,304, leaving a balance of $168,258 paid over to the trustees. The trustees report a balance of $551,136 on hand, after payment of the bonds mentioned above. There are land contracts held amounting to $308,865, besides 311,191 acres of land unsold.

Included in expenses are renewals and improvements of the line, the chief of which was 6,650 tons of new steel rails, 525,000 new ties, 31 miles of new siding, 139 miles of new fence and 95 miles of track ballasted.

Expenditures for new construction on the Michigan Central line proper amounted to $189,935, the chief item being $175,000 for cost of the Saginaw Bay & Northwestern road, a lumber line, 63 miles long, which has proved a valuable feeder to the main line. Expenditures for construction on the Canada Southern line, which appear only on the books of that company, amounted to $26,357.

Lake Shore & Michigan Southern.

The mileage of road worked by this company at the close of 1885 was as follows:

	Miles.
Main line, Buffalo to Chicago	540 49
Branches owned	324.38
Three proprietary roads, wholly owned by this company	160.07
Total owned	1,024.94
Five roads leased	315.41
Total worked	1,340 35

There are 266.24 miles of second track and 549.23 miles of sidings, making a total of 2,159.82 miles of track, whereof 1,594 miles are laid with steel, 73 miles of steel having been laid last year. The only changes reported are an addition of 1.23 miles of new sidings.

The equipment includes 535 locomotives: 134 passenger, 2 dining, 28 smoking, 12 combination, 20 emigrant and 105 baggage and mail cars; 10,111 box, 1,288 stock, 265 oil, 1,842 flat, 2,692 coal and 268 caboose cars; 2 pay cars, 10 derrick, 6 tool and 147 dump cars.

The general balance sheet is as follows:

Liabilities.

Capital stock ($533,500 is 10 per cent. guaranteed)	$50,000,000
Funded debt:	
Lake Shore & Michigan Southern, 864.87 miles	45,942.000
Detroit, Monroe & Toledo, 62.36 miles	924.000
White Pigeon & Kalamazoo, 36.57 miles	600 000
December pay-rolls, vouchers, etc	1,131,670
Dividend paid Feb. 1, 1885, viz.:	
5 per cent. semi-annually, guaranteed stock	26,675
Income, or profit and loss account	6,604,510
Total	$105,228,855

Assets:

Lake Shore & Michigan Southern and branches, 864.87 miles	$66,700,000
Equipment—535 locomotives, 16,932 cars	17,'00.000
Total	$84,000.0'0
Detroit, Monroe & Toledo, 62.36 miles	1,381,600
White Pigeon & Kalamazoo, 36.57 miles	910,000
Northern Central Michigan, 61.14 miles	1,357,000
Jamestown & Franklin, 51 miles	2,148,559
Chicago & Canada Southern	715,000
Stocks owned:	
Lake Shore & Michigan Southern (2,681 shares)	268,100
Detroit, Monroe & Toledo Railroad (4,140 shares, entire issue except one share)	414,110
Cincinnati, Wabash & Michigan (4,384 shares)	437,000
Pittsburgh & Lake Erie (stock 18,510 shares and $92,550 scrip)	2,141,111
Capital advanced to co-operative despatch lines	32,229
Merchants' Despatch Transportation Co	575,700
Erie & Western Transportation Co	45,500
N. Y., Chicago & St. Louis ($14,050,000 Pref'd, $12 480,000 Com'n)	6,527,000
Clev., Lorain & Wheeling ($717,000 Preferr'd, $169,100 Common)	717,000
Mahoning Coal R. R. ($137,650 Preferred, $113 085 Common)	250,735
Pittsburgh & Wheeling Coal Co	22,682
Union Steel Co	3.189
Pacific Hotel Co., Chicago—bonds and stock	440,713
Cash	235,795
Uncollected earnings (collected since Jan. 1)	1,588,590
General office property and other real estate	365,780
Supplies—rails, fuel, etc	673,474
Valley Railway, Cleveland—advances	277,988
Total	$105,228,855

All fixed charges due Jan. 1, 1886, were provided for Dec. 31, and included in the fixed charges of the year 1885.

The earnings for the year were as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Freight	$9,031,417	$9,358.817	D. $327,400	3.5
Passengers	3,629,375	4,133,729	D. 494,354	11.9
Mail and express	1,112,104	1,099.045	I. 13,059	1.2
Rents, etc	350,610	251,993	I. 98.617	39.1
Total	$14,133,506	$14,843,584	D. $710,078	4.8
Expenses	9,287,537	9,133,522	I. 154,015	1.7
Net earnings	$4,845,969	$5,710,062	D. $864,093	15.1
Gross earn. per mile	10,515	11,075	D. 530	4.8
Net " " "	3,616	4,260	D. 644	15.1
Per cent. of exps	65.7	61.5	I. 4 2	...

Expenses include taxes, which last year amounted to $518,668, or 5.6 per cent. of the total expenses.

The disposition of net earnings was as follows:

Net earnings, as above		$8,845,969
Interest on funded debt	$3,374.938	
Rentals paid	439,168	
Dividends on guaranteed stock	53,350	
		3,867,456
Surplus for the year		$978,513
Add premium on consol bonds sold		1,270,712
Total to be accounted for		$2,249,225
Contribution to sinking fund	$250,000	
Real estate in Chicago	191,971	
Applied to reduction of current liabilities	1,807,254	
		2,249,225

The surplus over fixed charges was equal to 1.98 per cent. on the stock, but no dividend was paid. The consol bonds sold were to replace divisional bonds maturing.

In 16 years the company has paid 86 per cent. in dividends, an average of 5.375 per cent. yearly. The dividends earned and paid during this period have been as follows:

	Earn'd.	Paid.		Earn'd.	Paid
1870	9.60	8	1878	5.61	4
1871	8.37	8	1879	7.24	6½
1872	8.55	8	1880	11.28	8
1873	6 10	4	1881	8.02	8
1874	6.04	3¼	1882	8.37	8
1875	2.20	2	1883	8.11	8
1876	3.26	3¼	1884	4.02	5
1877	3.57	2	1885	1.98	0

The above does not include the dividends on the small amount of guaranteed stock, which are a fixed obligation.

The income account is thus stated:

Credit balance, Jan. 1, 1885		$4,547.256
Surplus earnings for the year		978,513
Premium on first consolidated bonds sold		1,270,712
Total		$6,796,481
Real estate bought in Chicago		191,971
Credit balance, Dec. 31		$6,604,510

No addition was made to construction or equipment accounts last year, all improvements being charged to expenses.

The train movement for the year was as follows:

	1885.	1884.	Inc. or Dec.	P.c.
Passenger-train miles	3,481,846	3,459,742	I. 22.104	0.6
Freight-train miles	6,316,179	5,828,746	I. 487,433	8.4
Total revenue miles	9,798,025	9,288,488	I. 509,537	5.5
Total locomotive miles	14,685,191	13,928,794	I. 756,397	5.4
Average load:				
Passengers, No	50.8	55.1	D. 4.3	7.8
Freight, tons	253.7	252.7	I. 1.0	0.4

The average earnings last year per passenger-train mile were 137.79 cents gross and 54.36 net; per freight-train mile, 142.99 cents gross and 41.94 net. Locomotive service cost 15.14 cents per mile run. Locomotives ran 1.499 miles for each revenue train mile.

The passenger traffic was as follows:

	1885.	1884.	Decrease.	P.c.
Passengers carried:				
Through	85,892	91,787	5,895	6 4
Local	3,393,382	3,537,409	144,027	4.1
Total	3,479,274	3,629,196	149,922	4.1
Passenger miles:				
Through	46,381,680	49,564.980	3,183,300	6 4
Local	130,448,628	140,938,872	10,490,244	7.4
Total	176,830,308	190,503,852	13,673,544	7.2
Average rate:				
Through	1.555 cts.	1.637 cts.	0.082 ct.	5.0
Local	2.237 "	2.357 "	0.120 "	5.1
Average, all	2.058 "	2.170 "	0.112 "	5.1

The average local passenger journey last year was 38½ miles against 40 in 1884. The through passenger journey is 540 miles.

The freight traffic for the year was as follows:

Tons carried:	1885.	1884.	Inc. or Dec.	P. c.
East-bound	4.341,610	4.006,220	I. 335.390	8.4
West-bound	3,681,483	3 359,468	I. 322,015	9.6
Total	8,023,093	7,365,688	I. 657,405	8.9
Ton-miles:				
East-bound	954.301,180	832,004.913	I. 122,296,267	14.7
West-bound	648,265,855	578,540,761	I. 69,725,094	12.1
Total	1,602,567,035	1,410,545,674	I. 192,021,361	13.6
Average rate:				
East-bound	0.5284 ct.	0.6232 ct.	D. 0.0948 ct.	15.2
West-bound	0.5887 "	0.6945 "	D. 0.1058 "	15.2
Average, all	0 5528 ct.	0.6524 ct.	D. 0.0996 ct.	15.3

Of the total freight movement last year 59.5 per cent. was east-bound and 40.5 west-bound. The average haul was 199.7 miles, against 191.5 in 1884. The figures given do not include company freight, which amounted last year to 79,016,627 ton-miles, at a cost of 0.399 cent per ton-mile.

The course of rates on the traffic of this road for 16 years past has been as follows:

Year.	Receipt per pass.-mile. Cent.	Profit per pass.-mile. Cent.	Receipt per ton-mile. Cent.	Profit per ton-mile. Cent.
1870	2.612	0.904	1.504	0.572
1871	2.808	0.869	1.391	0.478
1872	2.599	0.785	1.374	0.454
1873	2.542	0.664	1.335	0 389
1874	2.452	0.774	1.180	0.413
1875	2.387	0 554	1.010	0 273
1876	2.090	0.575	0.817	0.226
1877	2 319	0.672	0 864	0.291
1878	2 287	1.012	0.734	0.260
1879	2.223	1.049	0.642	0.244
1880	2.135	1.049	0.750	0.315
1881	1 988	0.868	0 617	0.203
1882	2.157	0 991	0.628	0.215
1883	2 196	0.918	0.728	0.276
1884	2.170	0.916	0 652	0.226
1885	2.058	0.808	0.553	0.154

Comparing 1885 with 1870, there has been an increase in the mileage worked of 32.3 per cent.; an increase in the passenger-miles of 10.2 per cent. only; an increase in the ton-miles of 179.2 per cent., and a decrease in the average rate received per ton-mile of 63.2 per cent. The cost per ton-mile last year was 42.8 per cent. of the cost in 1870.

The construction and equipment accounts remain unchanged from the previous year, all improvements having been charged to working expenses or income account. The capital stock of the company remains unchanged. The funded debt was decreased $250,000 by the regular yearly contribution to the sinking fund. The bonds of the Michigan Southern and the Cleveland & Toledo, which matured in 1885, were paid off and replaced by an equal amount of consolidated bonds sold for the purpose. The premium on these new bonds, amounting to $1,270,712, was credited to income account, as shown below.

The freight traffic shows an increase of 8.9 per cent. in the tons and of 13.6 per cent. in the ton-miles; but there was a decrease of 15.3 per cent. in the average rate per ton-mile, in consequence of which the freight earnings show a decrease of 3.5 per cent. The earnings from passengers show a decrease of 12 per cent., which was caused partly by a decrease in the passenger travel and partly by a decrease of 5.2 per cent. in the average rate. The earnings from all other sources show an increase.

The increase in the freight movement required a greater train mileage than in 1884, and this fact accounts for the increase of 1.7 per cent. in working expenses. These expenses were reduced to the lowest practicable point in 1884, and it was found impossible to make a further reduction last year.

The renewals for the year included 7,086 tons of new steel rails and 635,843 new ties. There were 169 miles of track ballasted and 143 miles of fence built. There is now 74 per cent. of all the track owned by the company laid with steel.

Savannah, Florida & Western.

This company operates (and owns either directly or through ownership of stock) 525.8 miles of road, including lines from Savannah, Ga., to Bainbridge, 237; Waycross to Jacksonville, 76; Dupont to Gainesville, 119 miles, and a number of shorter branches. The following report for the year ending Dec. 31 has been furnished us by the company:

The general account is as follows, in a condensed form:

Capital stock		$5,340,300
Funded debt		4,390,000
Bills payable		24,800
Current accounts		383,894
Profit and loss		200,236
Total		$10,339,230
Road and equipment	$9,936,744	
Materials on hand	91.379	
Current accounts	225,830	
Cash	85,277	
		10,339,230

The capital stock was increased $185,300 and bonded debt $13,000 during the year. Floating liabilities are only $6,208 in excess of the cash and current assets.

The earnings for the year were as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Passengers	$779.474	$707.794	I. 71.680	10.1
Freight	1,308,732	1,169,676	I. 139,056	11.9
Mails	104.170	82.769	I. 21,401	25.8
Other sources	269,237	279,570	D. 10,333	3.7
Total	$2,461,613	$2,239,809	I. $221,804	9.9
Expenses	1,996,957	1,859,102	I. 137,855	7.4
Net earnings	$464.656	$380,707	I. $83,949	22.0
Gross earn. per mile	4,682	4.266	I. 416	9.9
Net " "	884	725	I. 159	22.0
Per cent. of exps	81.1	83.0	D. 1.9	....

There was a considerable increase in both freight and passenger earnings for the year.

The expenses for the year were divided as follows:

	1885. Amount.	1885. Per cent.	1884. Amount.	1884. Per cent.
Transportation	$578,026	23.5	$591,188	26.4
Motive power	377.160	15.3	324.397	14.5
Maintenance of cars	205,313	8.3	228,667	10.2
" " way	486,240	19.8	397.625	17.8
General expenses	350,218	14.2	317,225	14.1
Total	$1,996,957	81.1	$1,859,102	83.0

There was a considerable increase in motive power, in maintenance of way and in general expenses. Decreases are shown in the expenses for transportation and for maintenance of cars.

Payments from net earnings were as follows:

Net earnings, as above		$464,656
Interest on bonds	$288,590	
" open accounts	5 401	
Other payments	6,289	
		300,280
Balance, surplus for the year		$164,356

No dividends are reported for the year. The surplus over charges, as shown above, was equivalent to 3.08 per cent. on the company's capital stock.

The traffic for the year was as follows:

	1885	1884.	Inc. or Dec.	P.c.
Train-miles	1,627,223	1,492,350	I. 134,873	9.0
Passengers carried	388,829	346.219	I. 42,410	12.3
Passenger-miles	27.075 688	22,466,993	I. 4,608.695	20.5
Tons freight carried	632,797	551,615	I. 81.182	14.7
Ton-miles	75,568,437	63,495,038	I. 12,073,399	19.0
Average rate:				
Per passenger-mile	2.88 cts.	3.15 cts.	D. 0.27 ct.	8.6
Per ton-mile	1.61 "	1.84 "	D. 0.23 "	12.5

The average passenger journey last year was 69.66 miles; the average freight haul was 119.42 miles. Both passenger and freight business show a large increase. Rates show a considerable decrease.